NSF Information Resource Plan

Also referred to as the "Enterprise Architecture Transition Strategy for NSF's Service Oriented Enterprise Architecture"

August 2006
Version 2.1

Document Change Record

Version Number	Date	Description
0.50	February 21, 2005	Initial Release
1.0	May 31, 2005	Initial Release to OMB
2.0	July 31, 2005	Updated all Programs; Changed name from NSF IT Implementation Plan to NSF EA Transition strategy; combined with NSF IT Implementation Plan; added performance measures for funded Programs from NSF METIS EA Repository
2.0	February 28, 2006	FY2006 Release to OMB Added mapping between Transition projects and IT investment portfolio; added Infrastructure Program Section Inserted "EA Program Plan" Language into EA section; updated "workstreams with "Programs" Inserted Section 4.5: Stakeholders; inserted sections x.4: Stakeholders in each Program Section; Moved parts of Section 3 to the TGF Added performance measures as milestones to individual Programs Inserted segment architectures into sequencing plan Inserted Quarterly EA Milestones (Section 5)
2.1	August 13, 2006	Added section for NSF Dissemination of Public Information

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1. Document Scope and Purpose

NSF's FY 2006 Information Resources Management (IRM) Plan defines the Agency's strategic information technology (IT) vision and strategy, consistent with the Agency's mission, goals, and objectives. The IRM plan is both a vision for the future use of information technology in NSF and a description of how current and near term IRM activities help accomplish the Agency's mission. The plan provides a framework for creating and maintaining the NSF enterprise architecture transition strategy and establishes the course for achieving the goals that are essential to fulfilling the mission of the Agency. NSF's Enterprise Architecture (EA) program is moving into a phase in which the EA is being implemented and integrated with other processes being carried out at NSF to better manage technology investments. This document covers guidelines for NSF to create an EA transition strategy and, in effect, implement the NSF Target Enterprise Architecture as described in NSF Target Enterprise Architecture document.

The purpose of this document is to:

- Describe how NSF disseminates public information
- Present an overview of the contents and process of developing the NSF EA and the NSF's service oriented architecture
- Provide a service-oriented framework for creating and maintaining the NSF EA Transition Strategy including:
    - A process for identifying gaps and/or redundancies in the current environment, and for planned IT investments, as compared to the target
    - A process for creating and maintaining a sequencing plan that comprises projects that move the agency from the baseline architecture to the target architecture
- Describe the projects determined to be necessary to move NSF from its baseline to the target EA and the sequence of those projects

For the purpose of this document we define the Transition Strategy as a series of steps undertaken by NSF, in conjunction with the CPIC process, to translate services (business and technical) identified in the EA into an actionable plan for stakeholders.

2. NSF Dissemination of Public Information

2.1. Background

NSF disseminates information on the Internet through a variety of communication channels. The NSF website (http://www.nsf.gov/) provides both general and program-specific information, while FastLane (www.fastlane.nsf.gov/fastlane.jsp) is primarily utilized in the research community, as it is the main conduit to submit grant proposals. NSF is committed to efficient, effective and consistent

use of its website to communicate information about the activities, programs, research results, and NSF policies. NSF has an information dissemination process for reviewing and approving information posted on the NSF website.

2.1.1.NSF Mission

Created in 1950, the National Science Foundation (NSF) is an independent U.S. government agency responsible for advancing science and engineering (S&E) in the United States across a broad and expanding frontier. NSF plays a critical role in supporting fundamental research, education, and infrastructure at colleges, universities, and other institutions throughout the country.

Unlike most other federal research agencies, NSF does not operate its own laboratories or research facilities (with the exception of operations in the polar regions). Instead, NSF's role is that of a catalyst, seeking out the best Ideas, providing state-of-the-art Tools and facilities, and identifying the most capable People and allowing them to pursue innovation. NSF directly supports scientists, engineers, and educators through their home institutions, usually colleges and universities, throughout the United States.

The NSF mission is set out in the preamble to the National Science Foundation Act of 1950 (Public Law 810507):

> To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes.

Ninety percent of funding is allocated through a merit-based competitive process. On average, NSF receives 40,000 research proposals and makes nearly 10,000 awards to 1,700 colleges, universities, and other public institutions throughout the country annually.

In addition to authorizing support of basic scientific research, the National Science Foundation Act of 1950 (Public Law 810507) makes NSF responsible for an information base on science and engineering appropriate for development of national and international policy, including facilities for S&E research, and for addressing issues of equal opportunity in science and engineering.

2.2. Web Content and the NSF Mission

The NSF website (http://www.nsf.gov/) is the agency's primary interface for disseminating information to scientists, engineers, university administrators, educators, business, vendors, the media, policy makers, and the interested general public. From an organizational perspective, NSF is composed of science and engineering Directorates and administrative offices that collaboratively provide content and manage the NSF website. Content for the website is provided by the organizations that have traditionally provided the content via printed publications.

NSF has specific policy, procedures and best practices with regard to web authoring and content, detailed in the *NSF Web Development Policy and Standards Manual* http://www.nsf.gov/web/guide/. All NSF web content is developed for the purpose of promoting and supporting NSF's mission. The NSF website is accessible to all, including those with disabilities and those without

reasonable access to advanced technologies. NSF also integrates industry best practices for web technologies such as XML, HTML, JavaScript, RSS, and CSS, and these best practices are documented in the *Manual*, which is updated periodically.

To help ensure compliance with standard policies and practices, NSF maintains a portal for web development on its Intranet, which has links to the *Manual* as well as a wealth of internal resources such as usage statistics, scripts, templates and graphics. The "Webdev" portal also is the entry point to our Webstage Manager application, which is used by all NSF webmasters to review, approve, and publish HTML, PDF, and other "static" files to the public web server. Webstage Manager maintains a log of all publish actions, as well as required certifications that each content item adheres to NSF policies for privacy, accessibility, and security.

The core content of the NSF website is managed by an internal content-management system, ePublish. ePublish provides NSF staff with the tools to publish information in five discrete categories of content: Funding opportunities and program information, News, Events, Discoveries (NSF research results), and Organizational information. The system provides basic online review and approval mechanisms, as well as an administrative console that lets each organization manage and customize the content on its home page. The News module is used both by the Office of Legislative and Public Affairs (OLPA) for preparing and disseminating official NSF news releases, and by each NSF Directorate and Division for publishing news and announcements specific to its audience.

The largest component of ePublish is the Program Information Management System (PIMS), an innovative content-management system that was one of the first of its kind in the Federal Government to provide a standard, template-driven approach to describing research and education programs and specific funding opportunities. A reengineered PIMS, with a much more flexible and user-friendly interface and more advanced tools for building XML-based workflows, was introduced in 2006. This version also enhances the system's ability to store XML snapshots of data, which are used to let reviewers easily compare different instances of a given funding opportunity or program description.

ePublish and the new PIMS are products of the new model of collaborative development NSF fostered 3 years ago by establishing the Web Advisory Group (WAG) and the Web Implementation Group (WIG) to ensure optimum oversight and management of the website. WAG is the policy body, chaired by the Director of OLPA and composed of senior NSF staff that represent the diverse interests within the Foundation. WIG, chaired by the chief of the Information Dissemination Branch of the Division of Administrative Services, addresses the technical and design considerations for the website, implementing and managing overall standards for consistent appearance and presentation quality, achieving economies of scale by identifying requirements and centralizing resources, and coordinating the organizational and navigational features of the site.

2.2.1.NSF Web Content for User Audiences

The home page for the NSF Web site allows users to select content organized for their needs: as applicants for funding, as educators or students, as the press, or as the interested public. The "MyNSF" feature allows users to create a personalized NSF Web page by selecting topics/information that is most important to them. The "MyNSF" functionality provides e-mail alerts to subscribers when new information is posted in the categories they select and also now includes a range of RSS feeds for specific content types.

The NSF website provides information that it targeted to four primary user groups: the research and education community that competes for NSF research awards; the public, including K-12 educators; public information/media professionals; and those who use NSF statistical information on science and engineering.

a. The Research & Education Community

Our primary audience is the research and education community. Potential applicants for NSF support use the Web site for information on sources of funding, procedures for application, and how to manage an award. Most of the information on these pages is prepared, reviewed, approved, and published automatically to the Web from ePublish and PIMS to present the most current information possible.

b. The Public

The NSF mission includes improving public understanding of public policy issues involving science and technology, through support for programs of informal science and engineering. This is accomplished primarily through media projects, museum exhibitions, and curriculum support. The NSF Website presents a changing array of stories and images about Discoveries related to NSF supported projects, along with links to science stories in the media, and on-line curriculum resources for teachers and students.

c. Public Information Professionals

While some Web content is designed for the public to search and use directly, some content is designed to make information on recent discoveries highly accessible to public information professionals, to encourage its use in media beyond the NSF Website. This includes images and films packaged for professional use as well as contact information for the public information office at NSF.

d. Science and Engineering Statistics

The NSF Act calls on the agency to collect and present data on U.S. science and engineering. In the last 10 years the NSF has placed a library of detailed statistical data on line, from detailed statistical tables to current topical updates. Thousands of pages of data on measures of science and engineering activity are available to researchers and analysts from the NSF Web site.

e. Other Users

Many pages on the Web site are maintained for the convenience of unanticipated users: information for visitors, those looking for job or contracting opportunities, and those who need information on the agency itself, related to such topics as budget, organization, performance assessment or policy. In addition, there are Web pages maintained independently by the National Science Board and the NSF Office of Inspector General, both of whom post some regular and special public reports.

2.2.2.Web Currency and Ease of Search and Navigation

1. Maintaining Current Content

NSF focuses on two features to maximize the usability of the Web site for users: maintaining up-to-date information, and making the content conveniently searchable.

NSF identified four primary user groups of its external Web site (www.nsf.gov): the research and education community that competes for NSF research awards; the public, including K-12 educators; public information/media professionals; and those who use NSF statistical information on science and engineering. Content and navigation is developed to meet the specific needs of these groups. Before release the newly designed pages are extensively tested for usability, and user statistics and voluntary user surveys are continually monitored to identify gaps and needed improvements.

To maintain currency, major Web content areas are updated automatically. These include program information, information on existing awards and funding, staff contact information, and lists of available publications. When any office in NSF takes formal action to update information on programs or staff, the same data automatically updates the external Web site. Updated internal records of award status and funding actions are available to the Web site daily. And when a publication is prepared, the approval system also makes that record available to the Web site.

To ensure that information for potential awardees is never out of date, NSF requires that all program information is reviewed and updated annually. In addition the process of approving new program information includes an automated check to ensure that potential applicants have a minimum of 90 days prior to the proposal deadline or target date. As a result, the information on the external NSF Website is both up-to-date, and highly usable for potential award applicants.

2. Ease of Search and Navigation

Ease of searching the NSF Web site is a primary focus. Along with searches of the entire Web site nsf.gov offers searches specific to research fields, and databases for awards, funding, calendar/events, and publications. Databases linked to the web site can be searched by recentness, topic, or by A to Z index. NSF uses formal information models such as XML schemas, document type definitions (DTDs), and Really Simple Syndication (RSS) to categorize, disseminate ad share information stored in systems.

2.2.3. Web Content Priorities and Schedules

The table of Web content uses the following definitions for priorities:

- Priority 1: Required by Law, regulation, Presidential Directive or other official directive or to ensure national security.
- Priority 2: Mission-critical and essential for program operations, but not required by law, regulation, or Presidential Directive.
- Priority 3: Frequently requested information or services that would improve business processes and/or customer service to the public.

- Priority 4: Other information.

Information on schedules refers to due dates for mandated reports, periodicity of updates (if applicable), or (in the case of statistical data) the most current existing data.

As required by EGov Act Section 207 (f)(2) NSF's current inventory of website content, priorities and schedules can be found on NSF's Website at http://www.nsf.gov/policies/egov_inventory.jsp

2.3. NSF Information Available on the Internet

NSF has three main offices that determine what content is made available on the NSF website: the Office of Legislative and Public Affairs (OLPA); the Budget, Finance and Award Management (BFA) Policy Office; and the Division of Science Resources Statistics (SRS). OLPA oversees and manages the public components of the NSF website, BFA provides review and clearance for NSF policy and program information and SRS provides statistics on scientific and engineering resources to fulfill NSF's legislative mandate. A detailed description for each of these offices follows.

2.3.1. Office of Legislative and Public Affairs (OLPA)

The Office of Legislative and Public Affairs (OLPA) uses the NSF website to communicate information about the activities, programs, research results, and NSF policies. OLPA employs a wide variety of communication tools and techniques to engage the general public and selected audiences, including Congress, the news media, state and local governments, other Federal agencies, and research and education communities. OLPA's five sections (Congressional Affairs, Media and Public Information, Communications Resources, Issues Development and Special Projects), collaborate with NSF's research directorates and offices to produce web content for these audiences. "Public" content includes:

- Discoveries – brief stories highlighting research results, focusing on some of the important discoveries and innovations that began with NSF-supported research.
- Special reports – mini-web sites that provide in depth looks at the latest advances and hot topics in science, engineering and education research.
- Research overviews – these pages identify the "big questions" in each field of science, engineering and education research supported by NSF and show how NSF-funded researchers are addressing them.
- Multimedia Gallery - photos, illustrations, animations, sound bites, radio and video programs, and pod casts to help the public learn about and explore fascinating advances in science and engineering.
- News and story ideas – news releases, media advisories, and fact sheets providing coverage of the latest advances at the frontiers of science, mathematics, and engineering, as well as agency activities and messages to the general public and other external audiences; also news releases published by grantee institutions and other partners.

- Legislative information including major NSF-related legislation in Congress, a calendar of hearings, hearing testimony and summaries, NSF budget information, and program information by state.
- Speeches, statements, and presentations by the NSF Director and Deputy Director in communicating the mission and work of the Foundation to a variety of audiences such as state governments, business and industry, and foundations and organizations.
- Now Showing – covering the wide variety of educational and informational projects, including films, museum exhibits and television and radio programs, supported by NSF to promote public understanding of science, mathematics, engineering and technology.
- Classroom resources - a diverse collection of lessons and web resources for classroom teachers, their students, and students' families, arranged by research area

OLPA has created a web management plan to develop and maintain these components. Priorities are set and revised on a weekly basis.

2.3.2. Office of Budget, Finance & Award Management (BFA)

a) Policy Office

The Office of Budget, Finance & Award Management's (BFA) Policy Office, located in the Division of Institution and Award Support, is responsible for the development, coordination, issuance, and communication of NSF pre- and post-award policies for NSF's assistance programs, and provides official clearance approval for all NSF proposal-generating documents. The Policy Office develops and issues grant, cooperative and other agreement policies, procedures and practices that are responsive to both Federal law and regulations and yet are sufficiently flexible to meet the needs of the diverse national and international programs of the NSF.

Policies, procedures and implementing guidance may be developed in response to administrative initiatives published by the Office of Management and Budget, Office of Federal Procurement Policy, General Services Administration and other Federal agencies involved in the oversight of grant activities. These initiatives, as well as proposed and newly enacted legislation, regulations and policies relating to grant activities are evaluated for possible implications and impact on the NSF grant activities, and the NSF grantee communities.

The Policy Office has responsibility for various manuals and publications that provide Foundation-wide proposal processing and award administration guidance, including the following:

- Grant Proposal Guide (GPG) - The NSF Grant Proposal Guide provides guidance for the preparation and submission of proposals to NSF and may be found online at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.

- Grant Policy Manual (GPM) - The Grant Policy Manual is a compendium of basic NSF policies and procedures, and addresses the NSF award process from issuance and administration of an award through closeout. The GPM is available online at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpm.

- Grant and Agreement Conditions - The NSF website contains links to the terms and conditions which govern various types of awards. The terms and conditions are available online at http://www.nsf.gov/funding/research_edu_community.jsp under "How to Manage Your Award."

All of these documents, as well as Frequently Asked Questions and information regarding the NSF proposal and award process, are available on the Policy Office Home Page at: http://www.nsf.gov/bfa/dias/policy/.

b) Budget Division

The Budget Division maintains the Budget Internet Information System within NSF's public web site. The site contains information about obligations and funding rates by fiscal year, state, and institution, in addition to budget levels organized by account, dating back to the inception of the Foundation. The site is used internally by NSF staff and by external stakeholders, including colleges and universities, congressional staff, and other government agencies.

2.3.3. Division of Science Resources Statistics (SRS)

The Division of Science Resources Statistics (SRS) fulfills the legislative mandate of the National Science Foundation Act to "provide a central clearinghouse for the collection, interpretation, and analysis of data on scientific and engineering resources, and to provide a source of information for policy formulation by other agencies of the Federal Government. . ."

To carry out this mandate, SRS designs, supports, and directs periodic surveys as well as a variety of other data collection and research projects. SRS surveys yield the materials for SRS staff to compile, analyze, and disseminate quantitative information about domestic and international resources devoted to science, engineering, and technology.

Upon completion of the data processing for the major surveys, SRS staff prepares abridged "InfoBriefs" that summarize and highlight new data findings prior to the lengthier publishing of the more detailed statistical reports and analyses. Each year, SRS produces about 30 publications, which can be roughly divided into the following categories:

- Detailed Statistical Tables: reports containing an extensive collection of tabulated data from each of SRS's surveys
- InfoBriefs: highlighting results from recent surveys and analyses
- Periodic "overview" reports such as:
    - *Science and Engineering Indicators*
    - *Women, Minorities, and Persons With Disabilities in Science and Engineering*

- *National Patterns of R&D Resources*

- Special reports, such as *US Doctorates in the 20th Century, Interstate Migration Patterns of Recent Recipients of Bachelor's and Master's Degrees in Science and Engineering,* and *Gender Differences in the Careers of Academic Scientists and Engineers*

In partnership with other Federal agencies such as the National Institutes of Health, the National Center for Education Statistics, the Bureau of the Census, the Bureau of Labor and Statistics, the U.S. Citizenship and Immigration Services (formerly Immigration and Naturalization Service), and the Department of Commerce's Patent and Trademark Office and International Trade Administration, SRS provides reports and data in a variety of formats and media. All reports are available online (html and PDF) and some are also available in print. In addition, SRS data are available on CD-ROM, and online through downloadable micro-data files. All Federal agencies that perform research and development (R&D) participate in providing the data for the SRS Federal Funds reports. SRS also works closely with universities, industrial firms, professional associations, and international organizations to provide comprehensive and up-to-date reports and information for NSF stakeholders.

2.4. Agency Disclosure of Information and the Freedom of Information Act (FOIA)

The Foundation makes available an enormous amount of information beyond that required to be disseminated by the Freedom of Information Act. The public can access most information about NSF without having to make a request for information under the FOIA, Section (a)(3) access provisions.

NSF is a small agency with one central FOIA office and maintains a single-track system. The Foundation receives approximately 250 to 300 FOIA requests annually. The Foundation receives most FOIA requests electronically, and upon request, is able to disclose releasable records electronically.

An estimated 90% of NSF's FOIA requests are for copies of funded grant proposals. These proposals routinely contain personal information exempt from disclosure under FOIA exemption 6 protecting personal privacy. In addition, they may contain confidential, proprietary business information potentially protected by FOIA exemption 4. Executive Order 12,600 requires the agency to contact the submitter and provide an opportunity to comment before any disclosure.

Management plans for improvement of information disclosure and FOIA operations are detailed in NSF's FOIA Management Plan, available online at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=foiamp06

2.5. Performance and Results of NSF's Information Dissemination Program

NSF has increased electronic outreach to the general public through its public-oriented website. An entirely redesigned website was introduced in January 2005, to better serve both the research and education community and the public. The planning, creation and maintenance of this website reflects a variety of inputs from several audiences.

The Web Advisory Group (WAG) and the Web Implementation Group (WIG) to ensure optimum oversight and management of the website. WAG is the policy body, chaired by the Director of Office of Legislative and Public Affairs and composed of senior NSF staff, representing diverse interests within the Foundation. WIG, chaired by the chief of the Information Dissemination Branch of the Division of Administrative Services, addresses the technical and design considerations for the website, implementing and managing overall standards for consistent appearance and presentation quality, achieving economies of scale by identifying requirements and centralizing resources, and coordinating the organizational and navigational features of the site. The WAG directs the overall content and style of the website. In making its decisions, it takes into accounts inputs from focus groups, customer surveys, and expert guests. The NSF WIG, comprised of representatives (mostly webmasters) from NSF's directorates and offices, implements the direction of the WAG. It also tracks customer usage and satisfaction.

NSF also seeks input from the research and education community, special audiences such as congressional staff, the news media, K-12 teachers and the general public. Methods for obtaining input have included a survey on the website, a broader survey (reaching beyond current visitors to the NSF Web site) to ascertain public preferences, and focus groups and usability testing to measure how well the site meets audience needs and expectations. According to past surveys, audiences wanted improved navigation, more science news, more research results, more images, and more multimedia content. NSF has developed a content management system for the Web site. The system (ePublish) improves both the reliability of information and the consistency of how it is presented across the entire site.

NSF's Public Affairs office oversees and manages the public components of the NSF website. Examples of "public" content include news, discoveries, special reports, research overviews, legislative information, speeches, lectures, webcasts, and the multimedia gallery. The Office of Legislative and Public Affairs (OLPA) created a web management plan to plan and maintain those components. Priorities are set and revised on a weekly basis. As a follow up to the site redesign, NSF is conducting periodic surveys to measure public satisfaction with the redesigned site. A second broad survey of public Web preferences and another round of usability studies are planned for the summer of FY06. NSF also collects and analyzes Web server log statistics on a continuing basis.

3. NSF'S enterprise architecture program

NSF has instituted an EA program to address requirements established under the Clinger-Cohen Act and has subsequently achieved 5 major milestones:

1. **Baseline EA:** The Baseline EA is contained in the ***NSF Current Environment Assessment*** document and is a snapshot of NSF's current business processes, human capital management and IT architecture. It includes an analysis of NSF's current environment and recommendations on how to eliminate redundancies in terms of technologies, applications, data, security and associated services

2. **Target EA:** The Target EA is contained in the NSF Target Enterprise Architecture document and the NSF METIS EA Repository and is a 5-10 year vision for increasing services and performance to customers and reducing costs through redesigned business processes, human capital management and IT Architecture. The Target EA uses the recommendations formulated during the baseline and the NSF IT vision as described by NSF executive Staff and the NSF Business Analysis team to depict the future/target NSF EA.

3. **Gap/Redundancy Analysis:** The ***NSF Gap/Redundancy Analysis*** is contained in its own document and is based upon a redundancy analysis of the baseline EA and a gap analysis derived from a comparison of the baseline and target EAs, business process reengineering projects and human capital considerations.

4. **Information Technology Sequencing Plan (ITSP):** The IT Sequencing Plan is a 2-7 year transition plan, contained in the ***NSF Enterprise Architecture Transition Strategy*** document, to move NSF from the baseline to the Target EA. The ITSP provides details on a series of critical projects and programs that needed to successfully realize the Target EA. (This document was formerly known as the Information Technology Implementation Plan and was changed to the ITSP based on information obtained from OMB during NSF's EA Assessment.)

5. **Technology Governance Framework (TGF):** The TGF is described in the ***NSF Technology Governance Framework*** document and establishes NSF IT Management in terms of the Capital Planning and Investment Control Process (CPIC), EA Management, Performance Measurement and Risk Assessment associated with NSF's EA, and the plans contained in the ITSP. The TGF also establishes and defines the Committees, groups, teams, etc. and EA marketing and communications strategy necessary to carry out the oversight of NSF enterprise architecture and associated IT Investments.

3.1. "Service" descriptions

- The different states (baseline, transitional and target) of NSF's Enterprise Architecture are represented as functional, data, network and security services, supporting data, technologies, applications and components. The Federal Enterprise Architecture (FEA) Reference Models provide the lexicon (descriptions and definitions) of the components and services that comprise the architecture while the SOEA describes ***how*** to use that lexicon (the FEA) in order to deploy and manage NSF's EA. Traditionally, service-oriented architectures (SOA) have been limited to "defining how two or more computing entities interact in such as way as to enable one entity to perform a unit of work on behalf of another." However, the NSF SOEA broadens the definition of "service" to include traditional technology services and Business Services. For a complete description of Service definitions, please see the NSF Target Enterprise Architecture document.

4. Enterprise architecture transition strategy

Creating and evolving the NSF EA Transition Strategy is achieved by integrating the services that comprise NSF enterprise architecture (baseline and target), services that are described as parts of investments in the NSF Information Technology Sequencing Plan, with the CPIC process as established in the NSF Technology Governance Framework (TGF) document. Doing so provides a clear "line of sight" from the EA to the EA Transition Strategy to the NSF CPIC process and IT investment portfolio.

Please see the NSF Technology Governance Framework document for a complete description of how EA Management, CPIC and the NSF EA are integrated.

5. NSF IT Sequencing Plan

As a part of the EA lifecycle NSF has developed an EA Baseline Architecture, a Target Architecture, a Technology Governance Framework (TGF) and an Information Technology Transitions Strategy, which includes the NSF IT Sequencing Plan (ITSP). The goal of the ITSP is to operationalize NSF's EA and technology vision by describing the path to the Target EA via a series of projects and subprojects that provide an integrated view of technology activities and results. The projects described herein represent a subset of all possible IT projects and are a result of the analysis carried out during the baseline and target phases of the EA development process.

The following Programs have been identified to be a part of the Transitions Strategy:

- Grants management*
- Strategic information management*
- Content management*
- Expanding CRM*
- Identity Management
- NSF Portal
- Enterprise management system
- Telework
- Enterprise Architecture
- Technology Governance Framework
- IPv6 Implementation
- Infrastructure

* *These projects comprise the PRAMIS Exhibit 300 business case*

- BP Recommendations Integration: as a part of the business analysis project a number of recommendations were made based on business process redesign effort. These recommendations have been integrated with the ITSP in the above-mentioned projects as applicable.

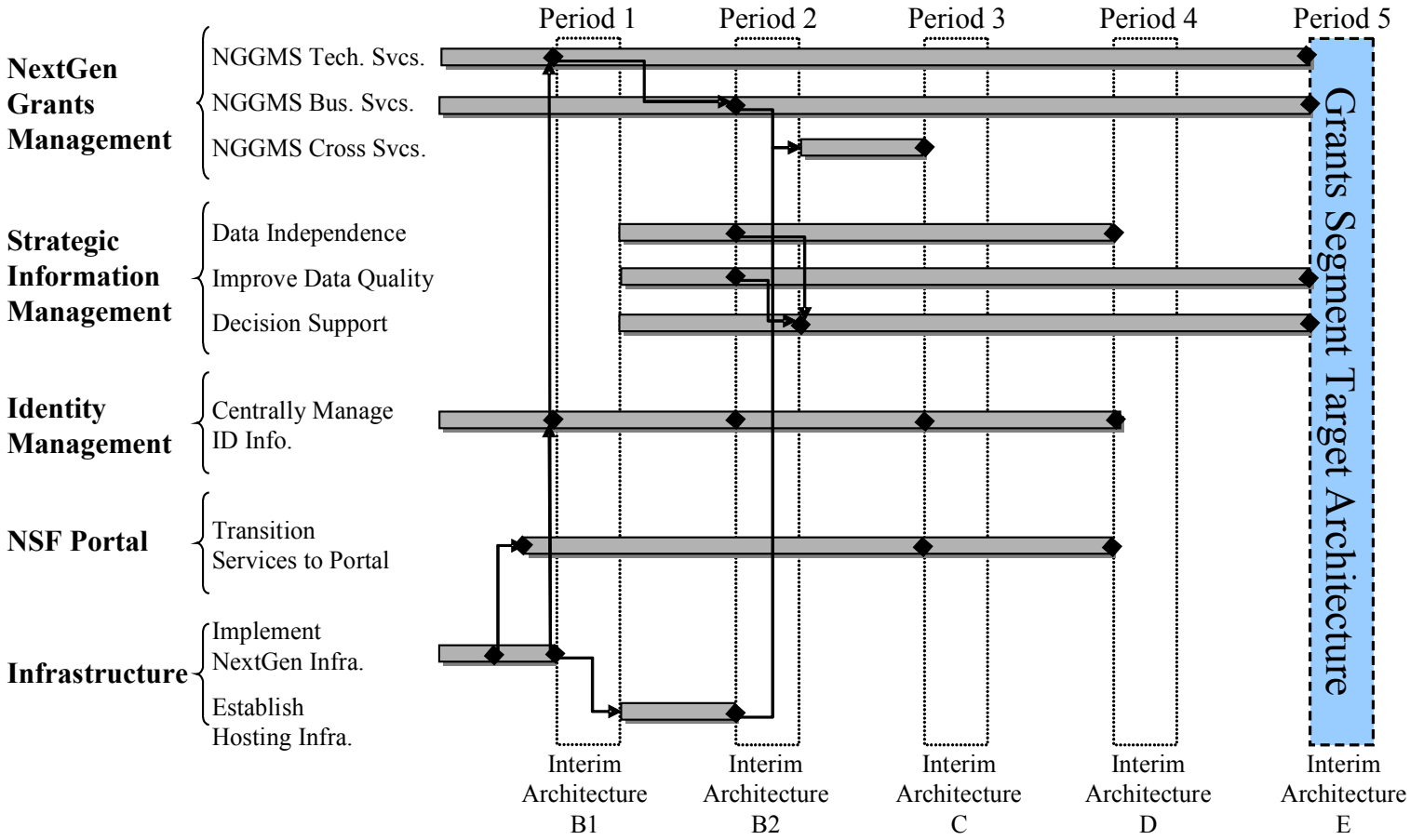
Projects of importance that should be included in future versions of the ITSP:

- Learning Management
- E-Gov Initiatives
- E-Human Capital

5.1. Grants Management Segment Architecture

The NSF EA Sequencing Plan depicts the overall sequencing of EA related activities across all segment architectures. Given that NSF's primary mission is the management of discretionary grants to the scientific, research and education communities of the United States a more detailed plan is necessary for the grants management segment architecture. In future versions of the EA Transition Strategy, more segment architectures will be included as project funding becomes available.

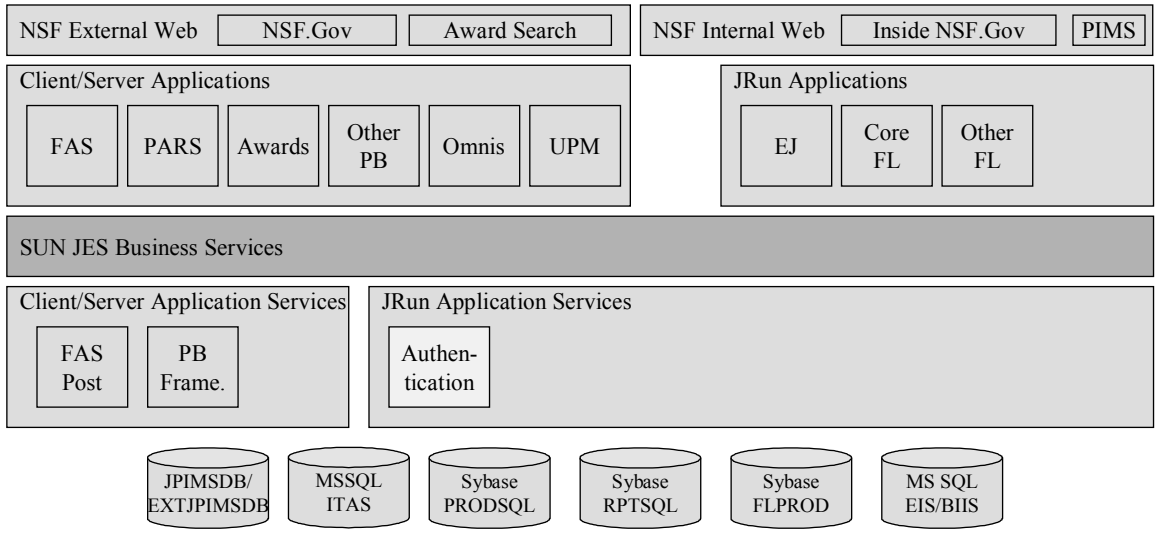
Figure 1: Grants Management Segment Architecture Sequencing Plan



5.2. Grants Management Segment Interim Architectures

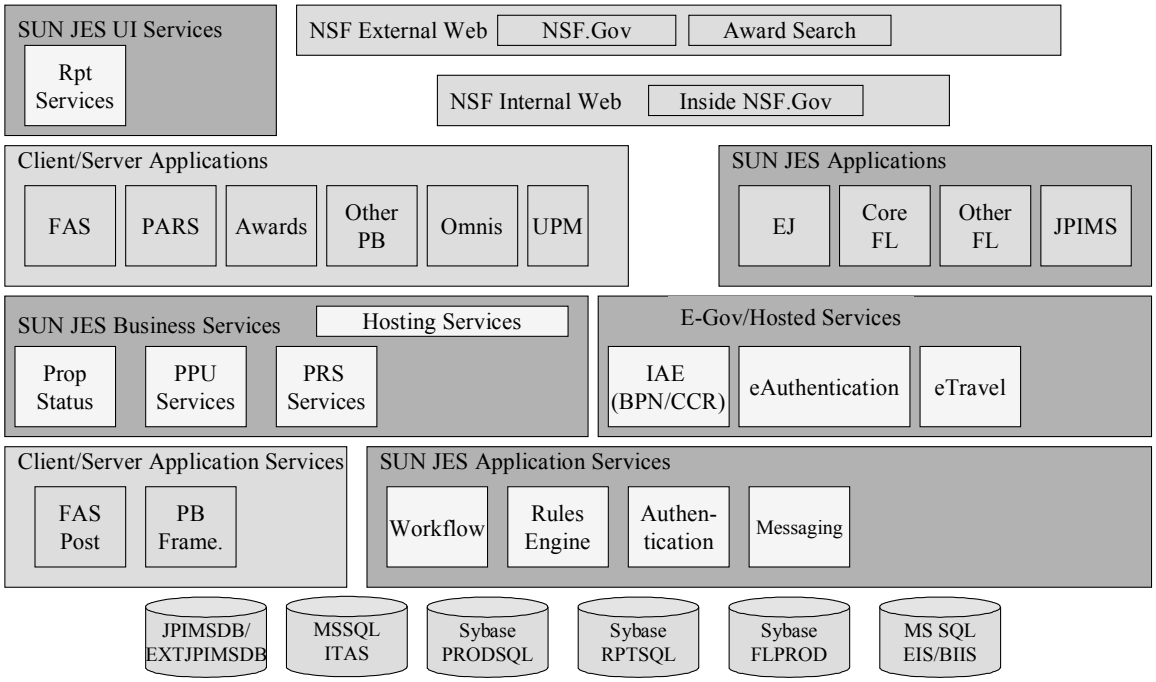
The Grants Management Segment architecture described in Section 5.1 is sequenced into a series of interim architectures that roughly correspond to Federal Government FY. The differences between each of the interim architecture are, expressed in services and infrastructural and architectural features are the primary contributing drivers in the formulation of yearly IT priorities and budget decision.

Figure 2: Grants Management Baseline Segment Architecture[1]



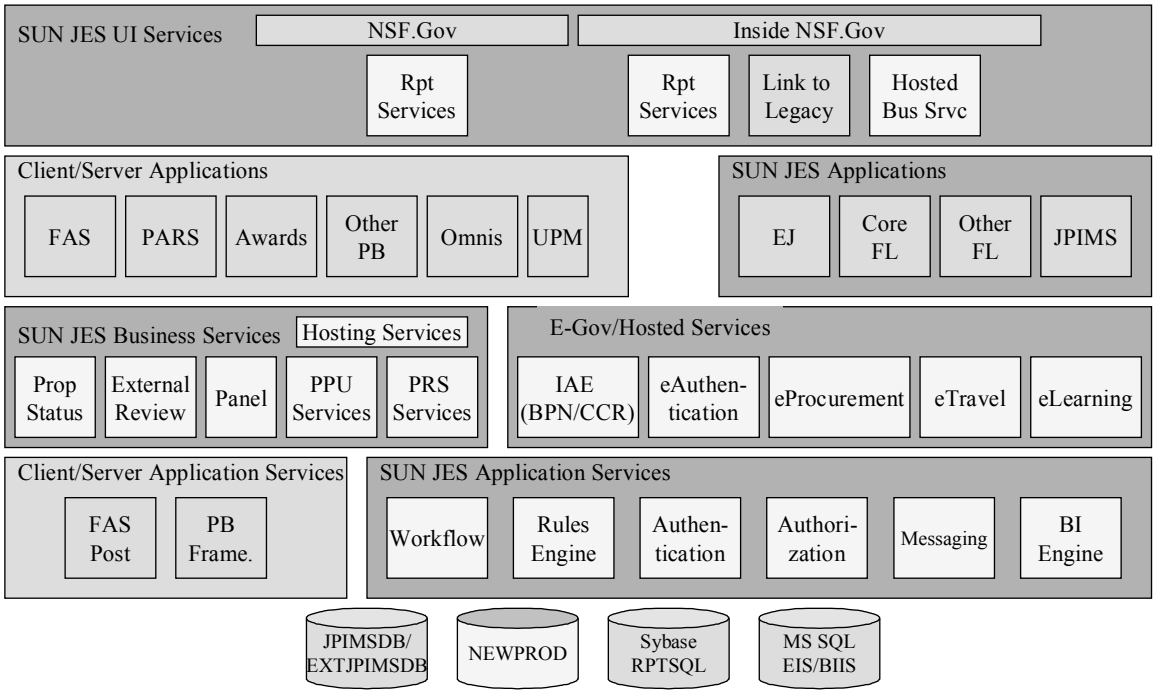
1 Key: Target Infrastructure Service | Target Business Service | Baseline Service

Figure 3: Grants Management Segment Architecture – Interim Architecture B1 (Per. 1)[2]



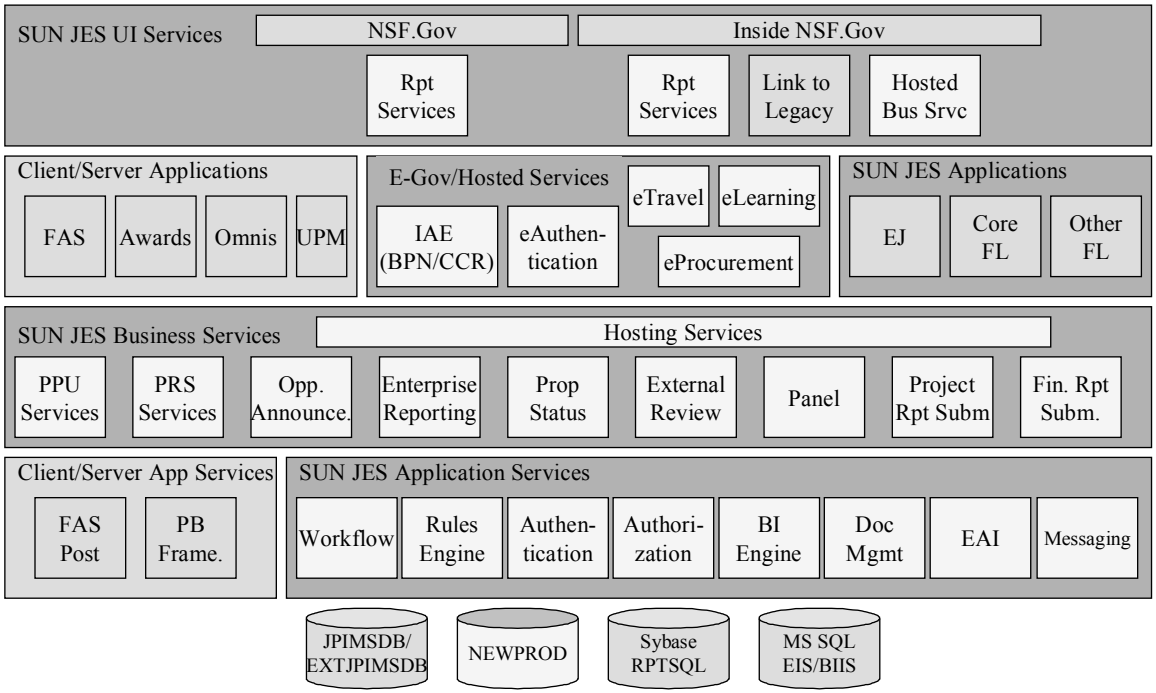
[2] Key: Target Infrastructure Service | Target Business Service | Baseline Service

Figure 4: Grants Management Segment Architecture – Interim Architecture B2 (Per. 2)[3]



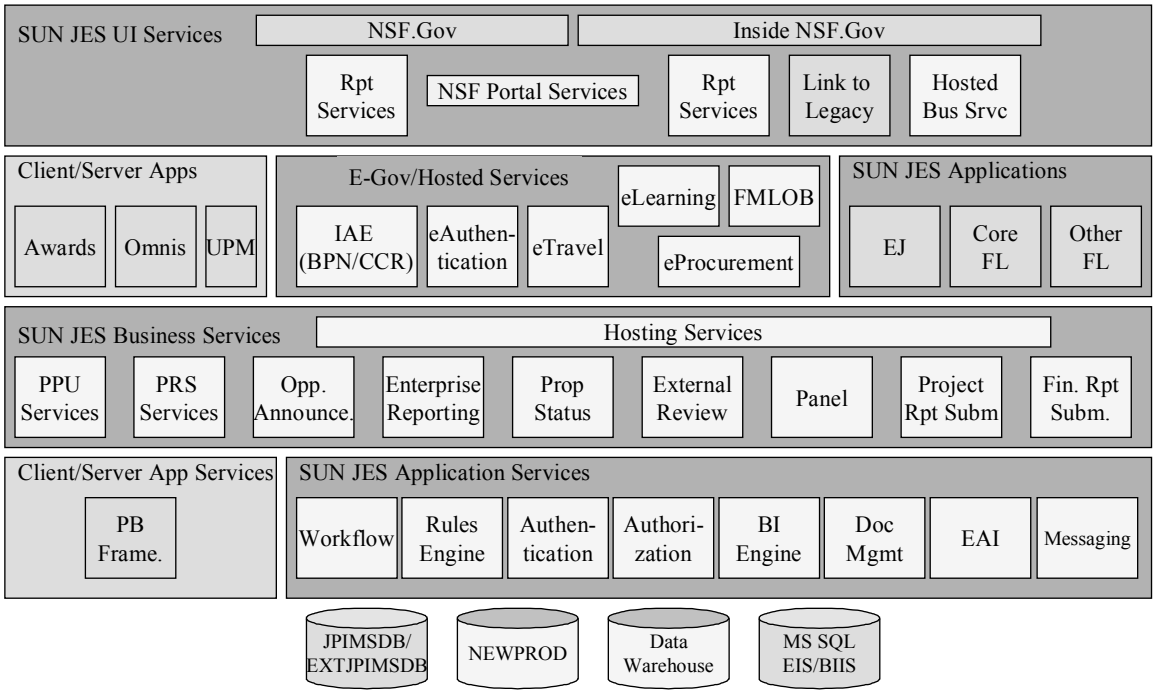
[3] Key: Target Infrastructure Service | Target Business Service | Baseline Service

Figure 5: Grants Management Segment Architecture – Interim Architecture C (Per. 3)[4]



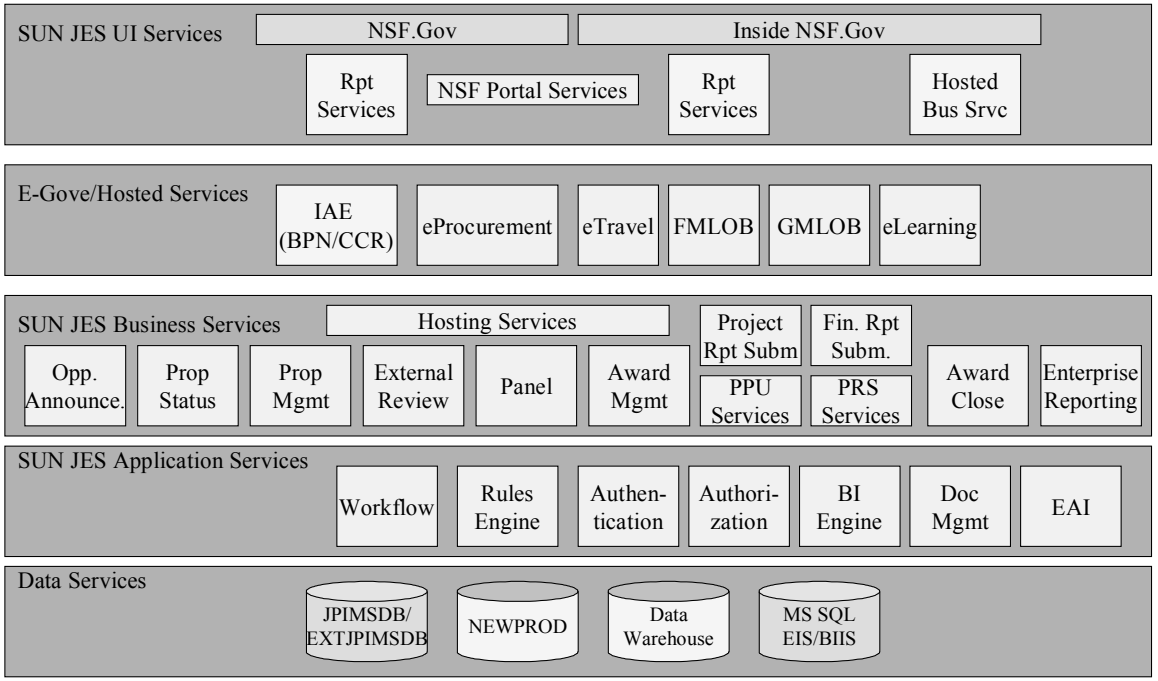
[4] Key: Target Infrastructure Service | Target Business Service | Baseline Service

Figure 6: Grants Management Segment Architecture – Interim Architecture D (Per. 4)[5]



[5] Key: Target Infrastructure Service | Target Business Service | Baseline Service

Figure 7: Grants Management Segment Architecture – Interim Architecture E (Per. 5)[6]



[6] Key: Target Infrastructure Service | Target Business Service | Baseline Service

5.3. Assumptions about time estimates and sequencing

- Time is the controlling factor and, therefore, a crucial assumption is being made that financial and human resources will be available to accomplish the task in the time allotted. If this assumption is not applicable in full or in part, project/task duration will vary. Regardless, project/ task durations contained herein are estimates and will likely vary even if appropriate levels of financial and human resources are available.

- Time estimates are based on gross groups of days:
    - Near term - 15 days or less
    - Short Term - 30-60 days
    - Mid Term - 90-120
    - Long Term 180 +

- Time estimates are based on Booz Allen's experience with similar project and a reasonableness factor given our knowledge of NSF

- All projects, unless otherwise specified, start on 10/01/04. This was done so as to provide a project baseline from which actual project start dates, end dates, durations, etc. could be derived. Actual start dates for the implementation will be determined by NSF in light of staff capacity and financial resources

5.4. Method and Approaches

The approach followed for developing the ITSP plan required that the NSF Business Analysis Emperies Architecture team work closely with business process and human capital sub teams as well as NSF staff over the course of the baseline and target EA development cycle. In general the following steps were followed for each of the work-streams described herein:

- Define the scope for each project
- Identify risks both at the enterprise and project level
- Identify assumptions and critical success factors
- Establish project milestones and dependencies within and between projects
- Integrating Business Process and Human Capital recommendations wherever applicable
- Estimate time-frames for each project

5.5. Scope

The scope of the ITSP is limited to the projects identified as a result of the analysis carried out during the baseline and target development phases of the EA and input from the NSF staff and senior management. The scope of the EA Transition Strategy provides NSF with 1) high-level steps to implement the projects; 2) identification of risks associated with those implementations and; 3) dependencies within and between the projects.

5.6. Stakeholders

Each of the Programs listed below will include a section listing stakeholders that are anticipated to have some level of interest in the program outcomes or operations. Stakeholders are defined as:

Stakeholder	Definition
Business Planners	Those NSF Employees engaged in Strategic planning and investments or chartering new strategic initiatives or projects
Institutions	A private or public organization, state or federal agency to which a principal investigator is affiliated.
IT Planners	Those NSF Employees engaged in determining the impact of proposed changes in business to various IT systems and infrastructure as well as ensuring that technology choices are consistent with enterprise standards
IT Project Teams	Those NSF Employees responsible for design, implementation and maintenance of IT projects
NSF Employees	An NSF employee, contractor or other individual perfuming functions on behalf of NSF
Oversight Boards	Any of the various oversight and advisory committees that exist external to NSF (e.g., the Business Operations Advisory Committee, National Science Board)
Principal Investigators	The individual designated by the grantee, and approved by NSF, responsible for the scientific or technical direction of the project.
Reviewers	The individual designated by NSF responsible for judging the scientific, educational, or sociological merit of a proposal.

5.6.1. Risk identification

The EA Transition Strategy identifies risks for NSF at two levels: risks common to all projects and project-specific risks. The common risks are included Section 5.7 below, while project-specific risks are included in each work-stream section. All risks have been aligned to the risk categories identified in the TGF, which in turn, are derived from the 19 risk categories required by OMB Exhibit 300s for investments in IT.

- ***Mission Alignment*** (Business, creating a monopoly for future procurements, overall project failure, strategic)
- ***Project Management*** (capability to manage the project, dependencies and interoperability between projects, feasibility, organizational and change management)
- ***Project Planning*** (initial cost, lifecycle costs, project resources, schedule)
- ***Security*** (Privacy, security and surety considerations)
- ***Technical*** (Data, reliability of system, technical obsolescence and technology)

5.6.2. Assumptions and critical success factors specific to projects

The ITSP is based on a set of assumptions that apply at the enterprise level (Section 5.1 above) and additional assumptions made for each project. The assumptions take into account the risks and NSF's current technology environment, industry standards and past experience on similar implementations.

5.6.3. Milestones and Dependencies

Milestones and dependencies within and between projects were established based on the technical components identified for each project. The milestones for each project are categorized in five phases corresponding to phases of a typical technology project lifecycle:

- ***Business Case*** – Business justification and cost benefit analysis carried out prior to the start of the implementation
- ***Requirements Gathering –*** Basic requirements considered in the process of developing the first version or a prototype of the system
- ***Design*** – System/Project functionality, architecture and infrastructure components
- ***Development*** – Factors to be considered as part of the development and/or integration of project components
- ***Deployment and Maintenance*** – Tasks for implementation and post implementation consideration and to ensure a smooth functioning and update of the system to meet business requirements
- ***Performance Milestones*** – Where applicable, performance milestones associated with the projects, and originating in the relevant exhibit 300, will be included in the project milestones sections. For complete information about project performance measures, please see the NSF Exhibit 300 associated with that project.

5.7. Common Projects Risks

The following section lists implementation risks common to all the projects listed as part of the ITSP.

NSF Risk Factor	OMB Risk Factor	Risks	Supporting Data	Likeli-hood	Impact	Risk Mitigation Strategy
• Project management	• Organizational and change management	• Resistance to change	• Resistance to changes that may come about with the implementation of these projects	• Med	• High	• Share information with employees and engage employees at all possible stages of the implementation cycle • Establish a change review board to manage organizational changes
• Project Management	• Capability of organization to manage the project	• Program management of multiple, simultaneous initiatives will be difficult	• Multiple projects will be implemented concurrently at NSF • Interdependencies between the projects may lead to conflicts	• High	• High	• Establish a program management office to plan and facilitate implementation of the projects
• Project Planning	• Project resources	• Limited resources	• Resources/people will not be available for the entire length of projects	• High	• High	• A process or system owner for the project should be identified and involved in the project from the start in a dedicated manner
• Project Planning	• Project resources	• Unavailable skills	• Projects should be staffed with people having the necessary skill sets	• High	• High	• Provide appropriate training to in-house staff to adequately meet the skill level required for various projects • Recruit staff with the appropriate skill-sets or outsource the implementation to a third-party
• Project Planning	• Organizational and change management	• Lack of adequate participation from business stakeholders in developing functional requirements	• Project teams may not get and adequate level of participation from functional or business units • Exclusion of stakeholders from the business analysis and requirements phase of the implementation may lead to inconsistency expectations	• Med	• High	• Create integrated project teams with representation from NSF's business coordinators and ensure ownership of projects • Seek joint ownership of project by business and technology groups to facilitate better co-ordination
• Mission alignment and project management	• Multiple OMB risk categories apply to this risk factor	• Failure Rates	• Historically, implementations of complex, enterprise-wide applications have significant failure rates	• High	• High	• A modular implementation approach leveraging prototypes and pilots is proposed to ensure a common understanding (and validation of assumptions) early in the process. • Implement iterative methodologies

NSF Risk Factor	OMB Risk Factor	Risks	Supporting Data	Likeli-hood	Impact	Risk Mitigation Strategy
						i.e., RUP (Rational Unified Process).
• Technical	• Technology	• In ability of projects to scale to extended user base	• External user community is very large	• Low	• Med	• Test system with the anticipated peak load capacity before implementation • Design and gauge the scalability of the solution that is being implemented
• Technical	• Technology	• Frequent changes in requirements	• There are requests for changes in requirements even after they have been finalized	• High	• High	• Institute NSF wide configuration control board for approving all change requests

5.8. Baseline EA Characteristics and Project Target Outcomes

The following table characterizes certain baseline aspects of the current NSF enterprise, the transition strategy projects that are described in this document and the target outcomes expected from those programs.

Baseline Characteristic	EA Transition Strategy Program	Target Outcomes
• NSF's core line of business is to make grants to promote research, science and education. Currently the technology infrastructure, applications, data architecture, and middleware supporting the grants making process can be characterized as fragmented with few data, development and procedural controls • The demands for better functionality in the applications will probably not be able to be met by the current infrastructure	Next Generation Grants Management System	• With the implementation of the NGGMS NSF will realize the following outcomes: o Seamless review, modification and tracking of grants information o Integrated financial and grants information o Web-based access to all NSF information o Enhanced business intelligence and analytical information o Automated and configurable workflow for grants management, approvals and content management

Baseline Characteristic	EA Transition Strategy Program	Target Outcomes
• NSF data structures are increasing in complexity in order to compensate for the lack of data management tools. There area multiple major and non-major applications which create and update the same data in multiple locations without transaction processing management • Issues with quality assurance and control, data standardization, data administration and ownership are identifiable within NSF • Most data sources lack clear ownership and record of authority • There is limited data documentation available for existing databases	Strategic Information Management	• The implementation of SIM will provide a plan to strategically manage NSF's information assets. The impact of implementing SIM will be realized in the following areas: o Data quality assurance o Definition of data and its standards o Rules for internal and external acceptable data use, duplication and transfer. o Effective meta data management o Developing skills within NSF to effectively manage data at an enterprise level o Data warehouse, data mart and operational data store constructs • The implementation of SIM will also provide the ability to convert data to business intelligence and analytics
• No uniform way of managing content at NSF. Directorates create content or documents with no standardized policy or process and tools and processes are duplicated • Edits to the content are not always approved prior to publishing leading to inaccuracy in information dissemination	Content Management	• The implementation of a Content Management System (CMS) typically comprises automated, configurable workflow, approval, edit and publishing capabilities and will have the following impacts: • The CMS will provide the necessary infrastructure for NSF staff to contribute, approve, edit and publish content and collaborate throughout the information lifecycle • The CMS will enable NSF to manage its information more accurately by providing the capability of real-time information access and also help manage information based on standard procedures, roles and responsibilities
• NSF's current CRM focus is on providing support for internal IT systems and services and FastLane. Very little attention has been directed toward using current IT investments	Customer Relation Management	Implementing additional CRM modules will enable NSF to: • Leverage the existing modules and reduce implementation time for additional modules

Baseline Characteristic	EA Transition Strategy Program	Target Outcomes
(e.g., Siebel) to improve services directly to the scientific community that are not IT related.		• Expand the use of current modules to address the customer service needs specific to the Program directorates • Capture information regarding customer service by establishing and meeting services levels with the scientific community and internal users • Implementation of additional modules, in conjunction with implementation of other projects will help reduce the workload within the directorates and distribute knowledge within the organization • Improve customer service through the collection and analysis of CRM metrics
• Currently multiple systems (ITAS, UPM, individual systems) provide authentication and authorization services to users • Each application requires a separate login and passwords • PI, Reviewer, NSF employee and Institution data are kept in more than 12 different systems even though much of the data is the same	Identity Management	• Implementing Identity Management will unify NSF's stakeholder information by providing a directory that accommodates NSF employees, PIs, institutions, reviewers, and other stakeholders • The directory will also establish a system of reference for all stakeholder information, authentication, and authorization • The implementation of Identity Management will enable NSF to build identity management tools and cater to personalization services • Identity Management will guide and exceed federal mandates for authentication and security (e-Authentication)
• Information dissemination at NSF is not carried out in a uniform manner. There is no single point of access or web-based access, for internal or external users to NSF applications, analytical knowledge, transactional data, and business-related information.	NSF Portal	By implementing a Portal framework NSF can: • Provide a single point of access for internal and external NSF information and applications (including inside.nsf) resulting in a streamlined user experience • Provide a framework to communicate with customer with personalization and customization • Provide a framework for personalized web pages by PI and/or SRO

Baseline Characteristic	EA Transition Strategy Program	Target Outcomes
		• Integrate applications into a framework with a consistent look and feel
• Presently there are six separate point EMS solutions that are deployed in and around DIS to some extent • None of these products provide auto-discovery of assets, systems monitoring, fault tolerance, patch management are inconsistently implemented • Service level agreements are rarely used • Performance, availability and other system metrics are not collected; no policy for collection and use exist • Computing environment outside of DIS largely unknown • Operations are in "reactive" mode for some critical events • Network/system performance and capacity unknown • Little ability to know or control assets	Enterprise Management System	The NSF target architecture is also characterized by providing tools and strategy to completely "know" about and monitor all computing components ranging from the physical network, servers and OS's to desktops application and virus definitions • Complete inventory of all devices connected to or interacting with the NSF network • The EMS will tie asset management to IT Capital planning, Federal Enterprise Architecture compliance measures, and capacity planning (data and load) • Monitor the performance and critical events on all major systems • Trend analysis through data structure and reporting tools supporting EMS data • Ease of administration through a single view into all enterprise management tools
• A working group at NSF has developed an assessment of Telework at NSF. Currently Telework is carried out in an informal way with no over-riding strategy, services or measurements to determine its effectiveness	Telework	Telework at NSF could have the following impacts on the organization: • Telework will ensure an appealing workplace, reduced absenteeism, reduced facility cost and additional opportunities. • Telework will ensure reduced cost in commuting and time and flexibility for the employees • Telework will also play an important role in reducing the burden on employees and reviewers once this capability has been fully developed by NSF
• The performance of IT projects is not measured and reported at regular intervals • There are very few risk identification and	Technology Governance Framework	The implementation of a Technology Governance Framework will have the following impacts on NSF: • Senior management will be able establish clear roles

Baseline Characteristic	EA Transition Strategy Program	Target Outcomes
mitigation strategies developed for IT projects • There are very few accepted technology standards or repeatable methods for system integration • Links between capital investment, EA and IT project performance are not clearly identified. There are very few alignment of business and IT in governance terms		and responsibilities to manage IT investments and establish an understanding of EA, CPIC and performance measurement and risk mitigation • Management will also be able to monitor the success/failure of IT project and inconsistent resource allocation on a quarterly basis • The OCIO will be able to view individual IT investment management in an holistic manner (Purpose, scope, participants and processes)

6. EA Quarterly Milestones

To support requirements for the NSF Next Generation Grants Management System and to support government-wide IPv6 transition, NSF is reviewing and updating its target network architecture. In terms of "completion and usage of the EA" this Next Generation Network Architecture is the focus of many of the quarterly milestones defined by NSF.

In accordance with OMB directives, NSF has established the following measurable milestones for the completion and usage of the NSF EA.

Date to Achieve	Milestone
4Q FY06	• Update NSF SDLC management tool with EA activities • Complete IPv6 Transition Plan • Submit FY08 "IT Infrastructure, Office Automation, and Telecommunications" Exhibit 300, which includes IPv6 transition • Update IRM Plan with IPv6 Transition • Conduct EA training session
1Q FY07	• Update EA with Next Generation Network Architecture • Add updated Next Generation Network Architecture to NSF EA repository (Metis) • Conduct EA training session
2Q FY07	• Update EA Transition Strategy with candidate IT projects based on Next Generation Network Architecture • Conduct EA training session

7. EA Transition Strategy/IT Portfolio Mapping

This table maps the NSF IT investment (Exhibit 53) with the Transition Strategy Program, project and sub-project. The purpose of this table is to provide a clear line of site from project through to investment for the best possible oversight and performance monitoring.

Exhibit 53 Line Item	EA Transition Strategy Program	IT Portfolio Project	Sub-project
PRAMIS	Next Generation Grants Management Systems	E-Jacket IV	E-Jacket
			Guest Travel
		PRAMIS	Rules Engine
			PIMS
			e-Human Captial
			Training System.LMS
			e-Human Capital
			Procurement System
			EIS/BIIS
		Enhanced Project Reporting	PRS
		Legacy/Maintenance	FastLane Maintenance
			PARS
			Awards
	Strategic Information Management	Data Architecture	Data Consolidation
			Enterprise Data Model
			EIS Upgrades
Support and Web Utilities	NSF Portal	Personalization & Customization	NSF Website
			Inside.nsf
Infrastructure	Enterprise Management Systems	BMC Implementation & Monitoring	
Enterprise Architecture	Enterprise Architecture	OMB EA Assessment	
	Technology Governance Framework	CIOAG Program Support	Meeting Support
Infrastructure	Identity Management	Corporate Directory	Decommission ITAS
	IPv6	Inventory	
		OMB EA Assessment	IPv6 Updates
	Infrastructure	Network Services	Network Architecture
		Communication Services	Exchange Upgrade
		Next Generation Infrastructure Services	Next Generation Web infrastructure Upgrades

Project Name:
8. Next Generation Grants Management

8.1. Introduction

NSF's primary mission is that of advancing science, research, engineering and education through grant-making and managing. To that end, the Target Enterprise Architecture has at its core an integrated end-to-end grants management system. NSF's current grants management system comprises a series of loosely integrated silo-applications that lacks the cohesive application, data, and middle-ware infrastructure necessary to optimize system and staff resources, integrate with inter-government initiatives (e.g., Grants Management Line of Business) and guarantee continued performance under increased system load, security requirements and demands for functionality and flexibility.

The Target Enterprise Architecture features a next-generation grants management system (NGGMS) based on and built using concepts employed by current successful systems (primarily FastLane, e-Jacket and PIMS) as well as other Target Enterprise Architecture technologies and concepts. The NGGMS, in employing the above technologies, will allow system users to seamlessly process and track programs from development to publish, and, proposals from submission to award close out. Users will be able to customize workflow, user interface preferences, delegation options and reporting requirements based on individual, division or directorate needs. The NGGMS will be tightly integrated, as will be the case with all enterprise applications, with the NSF Identity Management services and NSF Portal so as to provide role-based authentication, personalization options and consistent end-user experience.

Transactional data generated by NGGMS will be extracted, transformed and combined with other relevant data to produce a "grants management data mart" focused on providing Program Officers and other staff with the specific data and reports necessary to best support the scientific community. Furthermore, the NGGMS will be built on an integrated data structure, provided as part of the Strategic Information Management work-stream (Section 9), such that access to data is determined by role within (and outside) the organization. The NGGMS data structure will exist independently from applications and employ an architecture to allow maximum flexibility for:

- Integration with, or providing shared services for, the Grants Management Line of Business Initiative
- Integration with financial accounting systems and other e-services such as e-Travel
- Rapid addition and modification of functionality to meet changing user requirements

The NGGMS will also contain interfaces capable of enabling the following services/systems:

- Reviewer Knowledge Base

- An externally-managed reviewers database system that integrates application, awardee and reviewer database; externally manages service charted with collecting information on the expertise of reviewers and expanding the pool of reviewers
- Online reviewer applications*
- Online reviewer training*
- Functionality and services provide by and through the NSF Library including internet and subscription data sources

- Enhanced Grants Project Reporting
  - Redesign of a fully functional and robust Grants Project Reporting Systems to include integration of the current Nuggets DB

- Enhanced Notification Capabilities*
  - Concurrently notify Primary Investigators (PI) and Sponsored Research Offices (SROs) of an award decision
  - Generate automatic e-mail reminders for upcoming or missed deadlines (e.g., Project Report, announcements, etc.)

- EJ Phase IV+ Capabilities
  - Conflict of Interest
  - Committee of Visitors
  - Virtual Divisions
  - Role-based Processes

- Personalization & Customization
  - Provide PIs with personalized webpages at the time of proposal submission that contains information specific to that PI (e.g., proposals submitted, status, total awards, outstanding obligations, reminders, news, etc.) *
  - Provide SROs with web pages that communicate administrative and financial information and guidance for program support*
  - Ability to certify Applicant SROs prior to award decision*
  - Allow individual staff, Programs or Directorates to specify/customize workflow, appearance, security and accessibility option

- Scheduling & Coordination*

* *Please see "Process Designs for Merit Review and Awards Management and Oversight" produced as part of the NSF Business Analysis. Available at www.inside.nsf.gov/business analysis.*

- Establishment of a clearance process for coordinating program deadlines on a 2-year out basis with specific windows for cross-Directorate and unsolicited proposals
- Integration with scheduling systems with Exchange Calendar and Conference Room Scheduling

- Automated workflow
  - Implementation of a COTS, GOTS or custom enterprise solution to Grants case management that features an automated and configurable workflow
  - Automated/Expanded proposal compliance checking that allows for self-audit before proposal submission*****

8.2. Project Assumptions, Constraints and Critical Success Factors

Some of the key Assumptions, Constraints and Success Factors are outlined below

- The NSF NGGMS project will, to a greater or lesser extent, be integrated with the OBM Grants Management Line of Business Initiative
- Every attempt will be made by NSF to determine the best COTS and/or GOTS to any NGGMS component before determining that development of custom software is necessary
- Criteria for selecting/developing services or technology components will be subject to the select, control and evaluate phases of the NSF CPIC processes

8.3. Project Risk Management

There are several risks to the successful completion of this project and some of the critical ones have been identified below

NSF Risk Factor	OMB Risk Factor	Risks	Supporting Data	Like-lihood	Consequence/ Impact	Risk Mitigation Strategy
• Mission Alignment	• Strategic and Business	• OMB Grants Management Line of Business could supersede any or all of the NSF NGGMS functionality/sub-projects	• OMB is currently developing a series of investment guidelines for providing intra-agency back-office grants management services but it is not known exactly which sub-lines of business and business process will be included	• High	• High	• Develop scope, plans and capital investment strategies as modularly as possible. Doing so will minimize the impacts of changes to varying business functions

NSF Risk Factor	OMB Risk Factor	Risks	Supporting Data	Like-lihood	Consequence/ Impact	Risk Mitigation Strategy
• Project Management	• Capability to manage the project	• Project scope will not be able to be controlled	• NGGMS scope is large and will effect, and require involvement, from many areas of NSF	• High	• High	• Ensure that technology governance procedures are adopted and that all technology projects adhere to the schedules established in the Technology Governance Framework
	• Dependencies and interoperability between projects	• Dependencies between NGGMS sub-projects and other projects will not be able to be maintained	• Will require extensive coordination between project teams	• High	• High	
• Technical	• Data/Info	• Data integrity will be insufficient to provide data necessary to integrate systems	• NSF currently lacks an enterprise data model and quality assurance procedures/resources	• High	• High	• Ensure that the Strategic Information Management project is implemented that data integrity/data model is sufficient to support system integration activities
• Project Management	• Organizational and change management	• NSF's internal culture will reject changes to underlying data and technology in support of Grants Management	• NSF Directorates have a history of developing systems with overlapping functionality	• High	• High	• Ensure acceptance of project scope from senior management and cross-directorate groups • Ensure that IT projects initiated within directorates are in alignment with the NSF EA and follow established Technology Governance procedures

8.4. Stakeholders

Business Planners
Institutions
IT Planners
IT Project Teams
NSF Employees
Primary Investigators
Reviewers

8.5. Project Scope

The scope of this project is to define, design and implement the NGGMS at NSF.

- Business Case
  - Strategic rationale for NGGMS is in the process of being established as part of the PRAMIS exhibit 300 including E-Jacket Phase IV
  - Costs and Benefits are, in part, identified as part of the business process work performed as part of the NSF Business Analysis
- Requirements Gathering & Design
  - EJ Phase IV requirements
  - Comprehensive program management plans to ensure clarification of project scope, parameters as well as defining communication and coordination with team members
  - Internal and external stakeholders
  - Security Requirements
  - Requirements and design documentation for testing, deployment and optimization of each NGGMS sub-project
  - Dependencies between NGGMS sub-projects and other areas of the EA Transition Strategy
  - Training and end-user documentation
  - Human resources impact analysis
- Deployment and Maintenance
  - EJ Phase IV development
  - Near-term changes to processes and existing systems
  - Reviewer Knowledge Base modifications
  - Scheduling systems
  - Implementation of automated workflow
  - Personalization & customization options for grants management systems
  - Training and documentation
  - Security implementation

8.6. Project Approach and Milestones

The table below illustrates the major milestones to be achieved in the NGGMS implementation.

Phase	Major Milestones	Dependencies/Assumptions

Business Justification	• Develop NGGMS Business cases
	  o Define the business goals
	  o Conduct a Cost-Benefit Analysis
	• Determine impact of OMB GMLOB
		• GMLOB decisions on scope and funding

Requirements Gathering	• Establish comprehensive program management plans
	• Finalize EJ Phase IV requirements
	• Identify key stakeholders
	• Identify security requirements
	• Determine 1st iteration of system and integration requirement
	  o Determine Reviewer Knowledge Base hosting & management configuration as internal v. external.
	  o Select COTS, GOTS, Custom workflow
		• Business justification
		• Funding availability
		• Workflow could be the same workflow used in Content Management

Design	• Create a Logical Design for Reviewer Knowledge Base system by developing specifications including
	  o Target state
	  o Revised Business process maps
	  o Data model and architecture
	  o Data management procedures and/or vendor service level agreements
	  o Security
	• Conduct impact analysis for new system designs
	• Establish clearance processes for coordinating program deadlines
	• Determine PI/SRO/NSF staff web views and personalization options
	• Redefine notification capabilities
	• Design training and documentation
	• Determine performance metrics and data capture necessary to verify
		• Requirements gathering and definition
		• Stakeholder identification
		• Identity Management design
		• NSF Portal

Phase	Major Milestones	Dependencies/Assumptions

Development	• Implement enhanced notification capabilities from existing internal systems
	• Implement Reviewer Knowledge Base including
	  o Online reviewer applications
	  o Online reviewer training
	  o Integration of existing, quality-assured NSF reviewer databases
	  o Security
	• Begin integrating new COTS workflow into existing grants management applications
	• Begin offering personalized web pages to selected PIs, SROs and NSF staff
		• Design specifications
		• Technology Governance sufficient to establish project-related management procedures
		• Development, Test and Acceptance environments
		• Data Management procedures

Deployment and Maintenance	• Install systems in Production environment • Iteratively revise requirements, design and implementation of functionality based on performance requirements and metrics	• Successful pilots • Production systems • Management Procedures • System monitoring • Security certification and accreditation

Performance	Planned Improvements to Baseline	Actual Results
	• Integrate Proposal Decline Processing Through Implementation of an EJacket	• Successful Implementation of EJacket Pathfinder (Phases 1, 2, and 3)
	• Electronic Processing and Archiving of NSF's non-permanent records	• Over 99% of proposals are received electronically
	▪ Meet or Exceed PMA Requirements in Electronic Government	• NSF received the only green light for E-Government
	• Automate one of the last remaining paper-driven processes at NSF using the NSF target enterprise architecture technologies.	• Initial use of end-to-end automated guest travel capabilities for merit review panels.
	• Begin handling panelist travel via end-to-end automated guest travel capabilities.	• Initial use of end-to-end automated guest travel capabilities for merit review panels.
	• Post 25% of all discretionary grant • application packages on Grants.gov, including all discretionary grant programs using only the SF-424 family of forms	• Grants.gov integration completed and in use for find and apply functions.
	• Adoption/Implementation of e-Gov Solution Sets	• eTravel system implemented.
	• Consolidate multiple legacy grants admin applications into eJacket Pathfinder.	• eCorrespondence functionality moved to eJacket. Budget review function moved to eJacket. • TBD 2007
	• Migrate/Implement e-Gov Solution Sets	• Adopt Federal solution for automated travel.
	• Convert eJacket application to federated identity management.	• Users able to log in to FastLane with credentials from grants.gov and USDA
	• Post 75% of discretionary grant applications packages on Grants.gov, including all discretionary grant programs using only the SF-424 family of forms	• FY2006
	• Post all discretionary grant applications • packages on Grants.gov (100% complete)	• FY2007
	• FastLane - Improve % of proposals submitted electronically	• Over 99.0 % (FY06)

Performance	Planned Improvements to Baseline	Actual Results
	• FastLane - Improve % of proposals submitted electronically	• Over 92.5% (FY06)
	• FastLane - Improve % of proposals signed electronically	• Over 99.0 % (FY07)
	• FastLane - Improve % of PIs transferred electronically	• Over 99.0% (FY07)
	• FastLane - Improve % of panels using electronic means.	• Over 95.0% (FY07)
	• FastLane - Improve % of fellow-ship applications submitted electronically	• Over 92.5% (FY07)

Project Name:
9. Strategic Information Management

9.1. Introduction

The Strategic Information Management (SIM) project, or enterprise data architecture, will provide infrastructure and process plans for NSF to define data use, business intelligence and data business rules at the enterprise level. SIM includes defining the data architecture, enterprise data model, physical data structure, and developing rules, policies, standards and guidelines for data management, access and use. As recommended as a part of the Target EA the SIM project will include the following sub-projects:

- ***Data Architecture*** – A consolidated view (logical and physical) of NSF's information. The data architecture will be developed using data modeling and database/schema design techniques
- ***Data Warehouse (DW)*** – A central repository implemented at NSF to hold detail integrated information across various business functions performed by NSF
- ***Data Mart (DM)***– The data mart is a summarized subset of the enterprise's data specific to a functional area or department or time period
- ***Operational Data Store (ODS)*** – A structured data set that contains transaction-oriented data with little or no summarization
- ***Business Intelligence (BI)*** – Extracted and manipulated data from multiple data stores used to create information for effective decision making

The data warehouses and data marts are designed primarily to support NSF staff in making business decisions by providing access to accurate, consolidated information from various internal and external sources. The primary objective of data warehouse at NSF will be to bring together information from disparate sources and store the information in a format that is conducive to making business decisions. Every effort should be made to use existing systems such as NSF's EIS and to leverage expertise of the EIS staff.

9.2. Project Assumptions, Constraints and Critical Success Factors

Some of the key Assumptions, Constraints and Success Factors are outlined below

- The number and configuration of data marts, operational data stores as well as analytic reporting requirements should be determined based on specific needs and requirements
- The analytic and reporting needs will be user or directorate-specific
- EIS, BIIS and other existing systems will be leveraged to the greatest extent possible

- A common, unified view of enterprise data defined as a part of this project will have an impact on NSF-wide applications and further study will be need to be carried out to evaluate the impact of these changes
- Appropriate management and IT policies should be established to ensure data quality across the data warehouses, data marts and operational data stores
- Appropriate security policies are identified and implemented for data management
- Planning, design and implementation will be done iteratively in accordance with RUP principles
- Data models and the database designs will be evaluated against established benchmarks for performance.
- Identity Management will be available and contain user data access information (e.g., groups and roles)

9.3. Project Risk Management

NSF Risk Factor	OMB Risk Factor	Risks	Supporting Data	Likelihood	Consequence/ Impact	Risk Mitigation Strategy
• Technical	• Technology	• Inaccurate enterprise data architecture design	• The enterprise data architecture design may not accurately reflect underlying NSF business data	• Medium	• Medium	• Ensure that the data architecture is reviewed by subject matter experts and is consistent with the EA • Ensure logical data model represents the data needs of associated business processes • Ensure that the logical design translates into the development of a structured physical design during implementation
	• Technology	• Inaccurate meta data modeling	• The meta data models may not be an accurate reflection of underlying NSF business data	• Medium	• High	• Ensure the meta data models development takes into account the structure required for logical integration of the data architecture, taxonomy and data retrieval
	• Data/Info	• Improper data migration	• Data migration from existing sources not carried out using a consistent and planned approach	• High	• High	• Ensure a data migration plan is developed and piloted prior to migrating the information from and between databases • Conduct a vendor evaluation to identify appropriate ETL tools to be used in effectively managing SIM
	• Data/Info • Technology	• Improper data mart and data warehouse interfaces	• The interfaces between the data warehouse and the data marts not successfully implemented or the ETL tool interface is not successfully implemented	• Medium	• High	• The data flow between the data marts and the data warehouses are clearly documented as a part of the logical data model • Ensure that the data architecture includes the interfaces between various components of strategic information management

9.4. Stakeholders

Business Planners
Institutions
IT Planners
IT Project Teams
NSF Employees
Primary Investigators
Reviewers

9.5. Project Scope

The scope of this project is to define, design and implement a consolidated Strategic Information Management system at NSF.

- Business Justification
  - Strategic rationale for implementing SIM
  - Costs and benefits associated with each

- Requirements Gathering and Design
  - Conceptual and logical data model
  - Data management process model
  - Security requirements for data access and applications
  - Data entity/business function matrix
  - Data interoperability requirements (e.g., XML schema, security policies)
  - Business information that must be contained in the Data Warehouse
  - Subject areas to be included in the Data Warehouse, Data Mart and ODS
  - Extraction, cleaning, aggregation, transformation and validation of data
  - Data "refresh" program that is consistent with the timing of business cycles
  - Web-based, desktop software to access the data
  - Data warehouse and reporting tools training
  - Processes for maintaining, enhancing, and ensuring the ongoing success and applicability of the warehouse (e.g., Communities of Practice)
  - Training and documentation
  - Performance measures

- Implementation
  - Establish ownership for the DW (i.e., DIS since this is going to be a centralized data repository)
  - Establish administrative policies for managing the data being stored in the data warehouse - including archiving, access and update of dynamic content
  - Define and implement the physical data model
  - Implement the data management procedures and guidelines across the organization
  - Implement an integrated standardized vision of the data architecture across all directorates
  - Implement the transition plan for the data architecture
  - Data quality: Governance structures to make sure that the DW is secure from accidental tampering
  - Security Implementation

Ideally the DW should be the only feed for the data marts, but the DMs could have independent data sources too

Phase	***Milestones***	***Dependencies***
Business Justification	• Develop a case for implementing the SIM initiative at NSF • Define business goals • Conduct a cost benefit analysis	

Requirements Gathering	• Identify the scope of implementing the SIM
	• Identify security requirements for data access and applications
	• Determine the detailed user requirements for each component of the SIM
	  o Data warehouse
	  o Data marts
	  o Operational data store
	• Determine the number of data marts and operational data marts based on the business need
	• Identify a comprehensive list of reporting and analytical requirements
	• Develop detailed project plan for managing the implementation of SIM
	• IV&V data warehouse and business intelligence software and systems
		• ODS implementations will impact on NSF applications
		• Business Case Justification
		• Funding Requirements
		• Stakeholder identification

Phase	*Milestones*	*Dependencies*

Design	• Acquire data warehouse software/systems
	• Develop the initial data architecture –
	  o Data models
	  o Database designs
	  o Schema for the DW, DMs and ODS
	  o Data Warehouse and Data Mart
	  o Identify the specific business requirements for lines of business where data marts are needed
	• Data Extraction/Transformation/Cleansing
	  o Data Load
	  o Security
	  o Data Refresh
	  o Data Access
	  o Backup and Recovery
	  o Disaster Recovery
	  o Data Archiving
	  o Configuration Management
	  o Testing
	  o Change Management
	  o Operational Data Store
	• Data Extraction, Transformation and Load (ETL)
	  o Data Load
	  o Security
	  o Data Access
	  o Backup and Recovery
	  o Disaster Recovery
	  o Configuration Management
	  o Testing
	  o Change Management
	• Analytics/OLAP
	  o Identify the analytical tools to access data from the DW
	  o Identify existing reporting requirements at an
		• Business Requirements Identification
		• Detailed Project Plan
		• Reporting Needs
		• Directorate specific Data Mart and ODS requirements

Phase	*Milestones*	*Dependencies*
	enterprise level o Identify new reports required o Assign roles and responsibilities for running the reports o Identify the reporting formats for current and future reports • Determine performance measures and data capture necessary to verify • Develop pilots to include: o ETL o Report generation o Performance measurements	
Development	• Install data warehouse systems in development and test environments • Add data content to be loaded into the data warehouse • Implement data use guidelines and data management procedures • Create and run reports on data marts and DW. Include stakeholders as a part of the business of the review process	• Clearly finalized logical and physical data models • Design stability of the enterprise data architecture • Clearly defined scope for data architecture
Deployment and Maintenance	• Install the SIM system in the Production environment • Iteratively revise requirements, design and implementation of functionality based on performance requirements and metrics	• Successful pilots • Production systems • Management Procedures • System monitoring • Security certification and accreditation

Performance	Planned Improvements to Baseline	Actual Results
	• Develop a common repository for high-value enterprise data repository, and transfer existing data. Provide effective tolls for users to access and gain knowledge from data	• FY2007
	• Pilot at least one common, enterprise data repository and deliver an effective toolset to access that data	• FY2007

Project Name:
10. Content Management

10.1. Introduction

NSF's Target Architecture states that information on NSF's Intranet, Extranet and Internet will be of excellent, manageable and guaranteed quality. NSF needs a system and processes in place to create, manage, approve, edit, publish, and archive information in addition to facilitating its online information management. Content Management Systems (CMS) provide the necessary infrastructure for staff to effectively contribute content and collaborate throughout the information lifecycle and comprises methods for content creation, automated and configurable workflow, approval, edit, publishing and archiving capabilities. A CMS will enable NSF to improve its information accuracy by accessing to real-time/up-to-date information as well as enhance staff efficiency and productivity by reducing duplication of information.

Also included in the scope of the Content Management projects are:

- ***Document Management*** – procedures and tools for inputting, classifying, storing and retrieving NSF information
- ***Collaborative Work Environments*** – procedures and tools for creating and sharing ideas, interests, schedules and project information

10.2. Project Assumptions, Constraints and Critical Success Factors

Some of the key Assumptions, Constraints and Success Factors are outlined below

- Sun JES environments development, test, acceptance, demo and production environments have been established, are operational and have existing processes and procedures for their maintenance and for the migration of code from one environment to the other
- Identity Management have been implemented NSF-wide and have been populated with the necessary information to form the basis of a system employing identity management functionality
- The CMS initiative will be implemented in a phased approach with the most critical content included in the first phase
- The CMS solution adopted will need to integrate with applications and systems, both existing and those in the pipeline. The integration issues, efforts and cost for each of the applications will need to be evaluated separately
- CMS features will be based on business requirements
- Online information will be continually reviewed and updated by content editors so that other content consumers, including customers and search engines, have access to the most up-to-date version available
- The CMS solution will be compliant with appropriate government/industry regulations
- CMS will be used in conjunction with data management and quality assurance processes (see SIM).

10.3.Project Risk Management

There are several risks to the successful completion of this project and some of the critical ones have been identified below

NSF Risk Factor	OMB Risk Factor	Risks	Supporting Data	Likelihood	Consequence/ Impact	Risk Mitigation Strategy
• Project Management	•	• Content management processes cannot be identified; workflow cannot be established	• Content management is done across NSF using varying systems, processes and control procedures	• Med	• High	• Ensure that the CMS is used for processes that are well understood as a first priority in order to develop credibility for the system across the agency
• Project Planning	• Initial cost • Lifecycle cost	• Overall Complexity will result in a project too costly to continue		• High	• High	• Minimize risk by splitting the implementation into multiple phases and limiting the initial scope and complexity of the effort. This will also help in developing an understanding of underlying business processes that are fundamental to the success of subsequent CMS phases
• Project Management	• Organizational and change management	• Lack of clearly defined responsibilities and ownership		• Low	• High	• A project plan with clearly defined responsibilities and actions needs to be signed off by stakeholders

NSF Risk Factor	OMB Risk Factor	Risks	Supporting Data	Likelihood	Consequence/ Impact	Risk Mitigation Strategy
• Technical	• Technology and Technical Obsolescence	• Inconsistent Technical Standards	• NSF currently does not have an enterprise standard in place for its applications and systems	• High	• Medium	• Ensure that the CMS system is built using uniform and open standards like XM and open protocols as outlined in the Governance document.
	• Data/Info • Project management	• Integrate all NSF Information into CMS through one release	• NSF applications and data cut cross a wide spectrum of technologies	• High	• Medium	• Implement the CMS in a phased approach with the highest priority being given to the most critical data and applications
	• Data/Info	• Inconsistent Content Quality	• Manual entry and update of NSF information leads to data that is inconsistent in quality	• Medium	• Medium	• The use of a suitable Enterprise workflow will provide the necessary checks to ensure that Data is of the highest quality.

10.4.Stakeholders

Business Planners
IT Planners
IT Project Teams
NSF Employees

10.5.Project Scope

The scope of this project is to define, design and implement a CMS system at NSF.

- Business Justification
  - Rationale for developing a CMS system at NSF
  - Costs and benefits
- Requirements Gathering and Design
  - Project Plan based on RUP
  - Requirements, current processes and systems analysis

    - User requirements and roles
        - Workflow
        - Training/documentation
        - Information sharing
    - Current content audit/assessment
    - New content management processes design
    - Archive and storage requirements
    - Taxonomy design guidelines and data information templates
    - IV&V CMS technologies
    - Security model
    - Pilot project selection
- Development, Deployment and Maintenance
    - Product selection and installation
    - Enterprise workflow integration with existing systems (as necessary)
    - Security and access privileges to both content and applications
    - Pilot implementation
    - Training/user guides and technical documentation
    - Determine impact of implementation and integrate lessons-learned
    - Deploy the CMS system enterprise wide

10.6.Project Approach and Milestones

The approach to implementing an enterprise Content Management System should be phased with the most critical content being migrated or incorporated into the system in the first phase. NSF will also need to establish and incorporate an enterprise workflow during this stage. Subsequent phases will incorporate additional content based on the priority and sequencing plan, which will have been established in the planning stage.

The table below illustrates the major milestones to be achieved in the Enterprise Content Management System's implementation.

Phase	Major Milestones	Dependencies/Assumptions
Business Justification	• Develop CMS business case - Define the business goals - Conduct a cost-benefit analysis	• Sun JES environments established • Identity Management successfully implemented

Phase	Major Milestones	Dependencies/Assumptions
Requirements Gathering	• Determine user requirements including the business need for enterprise workflow, taxonomy, document retention and information sharing • Develop a detailed Project Plan • Conduct content assessment • IV&V content management systems	Business justification
Design	• Create a logical design for the systems • Examine current data; adapt and finalize the data conversion strategy • Ensure look and feel for the system consistent with the requirements and other NSF applications • Design performance measures and determine which data can be used to verify	Requirements System acquisition

Development	• Design specific pilot implementations for
	  o Workflow, approval, edit and publish
	  o Document classification, retrieval/search and archive
	  o Information sharing
	• Conduct training and provide documentation for users and system and content owners
	• Establish access privileges to both NSF content and applications
	• Convert data from existing systems
	• Ensure appropriate audit records are created for tracking performance
		Design

Deployment Maintenance	• Install the CMS system in the Production environment. This will also include loading and testing the content produced by the CMS • Allow authors to locate, create and manage associations and links among parts of content • Add/update/delete content on a periodic basis	• Successful pilots • Production systems • Management Procedures • System monitoring • Security certification and accreditation

Project Name:
11. Customer Relationship Management

11.1. Introduction

NSF's Target Architecture includes expanding the CRM services currently provide via the Siebel CRM system in three dimensions:

- By implementing additional modules and functionality to the current Siebel installation
- By expanding the use of current modules to address the customer service needs specific to the Program directorates*
- By determining the information about customer services NSF needs to improve and then establishing and meeting services levels with the scientific community and internal users

NSF's current CRM focus is on providing support for internal IT systems and services and FastLane. Very little attention has been directed toward using current IT investments (e.g., Siebel) to improve services directly to the scientific community that are not IT related. Expanding customer relationship services and associated tools from an IT focus to more broadly applied business will afford NSF the opportunity to reduce CRM workload within the directorates, provide better service to the scientific community and distribute knowledge across the organization. Additionally, the CRM work-stream will including improving the processes for collecting and using information about NSF customer service activities such that they are sufficient to establish and meet service levels and increasing customer service demands.

11.2. Project Assumptions, Constraints and Critical Success Factors

Some of the key Assumptions, Constraints and Success Factors are outlined below

- The CRM processes will be aligned with the CRM modules that have already been implemented at NSF
- Additional CRM modules may have to be acquired depending on user/customer requirements
- NSF has the required resources and cross-organizational participation needed to implement the project
- An appropriate Change Management process and organizational structures have been established
- Data quality and integrity issues will be separately identified and reconciled
- Appropriate business metrics will be identified and defined by the CRM project leadership team to assess the success of the implementation
- Differing and competing technical and process views from various directorates within NSF may or may not be reconciled to a common view

* *Please see "Process Designs for Merit Review and Awards Management and Oversight" produced as part of the NSF Business Analysis. Available at www.inside.nsf.gov/business analysis.*

- Directorates will be willing to participate in the distribution of customer service responsibilities
- SLAs will be mechanisms by which customer services are measured

11.3.Project Risk Management

There are several risks to the successful completion of this project and some of the critical ones have been identified below

NSF Risk Factor	OMB Risk Factor	Risks	Supporting Data	Likelihood	Consequence/ Impact	Risk Mitigation Strategy
• Project Management	• Organizational and change management	• Resistance to/Rejection of distributing customer service responsibilities	• Directorates currently provide much of the customer support services to the scientific community through personal interaction that results in repetitive inquiries and a concentration of institutional knowledge	• Medium	• Medium	• Ensure that Directorates will participate in the dissemination of knowledge necessary to provide customer support prior to additional investments • Train/educate first-tier support to address the majority of inquiries
• Project Planning	• Capability to manage the project • Feasibility	• Implementing CRM without defining an enterprise strategy	• NSF might deploy end-user functionality before the accompanying infrastructure in is place	• High	• High	• Ensure that as much knowledge as possible has been captured and made available to customer support • Pilot test workflow associated with escalating inquiries
	• Project resources • Dependencies and interoperability	• Lack of properly defined service level agreements (SLAs)	• SLAs are mechanisms by which a service organization promotes and communicates service expectations to end users. They also serve as a mechanism for determining what data should be collected about customers and services	• Medium	• Medium	• NSF Project Leaders should define performance based metrics to measure the effectiveness of the CRM effort • Set realistic expectations for the management and customers

NSF Risk Factor	OMB Risk Factor	Risks	Supporting Data	Likelihood	Consequence/ Impact	Risk Mitigation Strategy
• Technical	• Data/Info	• Data quality	• NSF directorates could have their own databases and applications that will add complexity to a unified enterprise customer data management	• High	• Medium	• Ensure that the Strategic Information Management (SIM) initiative is coordinated with the CRM implementation and project teams communicate during the design phase

11.4.Stakeholders

Business Planners
Institutions
IT Planners
IT Project Teams
NSF Employees
Oversight Boards
Primary Investigators
Reviewers

11.5.Project Scope

The scope of the project is to extend the definition and implementation of Customer Relationship Management System at NSF.

- Business Justification
  - Business case for extending CRM services
- Requirements Gathering and Design
  - CRM functionality currently in use at NSF
  - CRM functionality necessary to meet the customer service needs of the Program Directorates including CRM features and services necessary to expand services per the NSF Business Analysis MR/AMO Re-design
  - CRM data necessary to establish, meet and maintain realistic service level agreements
  - CRM modules and the specific features necessary to meet requirements
  - Roles and responsibilities for CRM specific tasks within NSF including escalation procedures
  - MR/AMO BPR (Business Process Reengineering) Plan including
    - New Process Design

        - Communication and Training Plan
    - Data model and reporting requirements
    - Extended security model
    - CRM module integration plan
    - CRM module deployment plan
- Development. Deployment and Maintenance
    - Education and training on the new processes and tools
    - Data migration and cleansing work
    - Support plan and introduce support team and mechanics
    - Customization, integration and testing activities
    - User acceptance testing
    - Rollout and migration
    - Continual re-evaluation of SLAs, customer service data and performance against SLAs

11.6.Project Approach and Milestones

The approach to implementing the NSF Enterprise CRM will be incremental. New modules and features will be added to the current CRM solution on an iterative basis with special emphasis on a number of small releases thus reducing the risk associated with a big release.

The table below illustrates the major milestones to be achieved during the CRM implementation.

Phase	Major Milestones	Dependencies/Assumptions
Business Justification	• Develop the CRM business cases	
Requirements Gathering	• Determine CRM requirements for Program Directorates • Determine CRM requirements for continuing IT support • Determine channel (customer access mechanisms; e.g., 800 number, self service, web site, etc.) • Match requirements to existing or new Siebel functionality • Acquire new functionality as appropriate	• Participation from Program Directorates • Business justification

Phase	Major Milestones	Dependencies/Assumptions

Design	• Establish SLAs based on Program and IT Help Central requirements
	• Expand the NSF Business Analysis MR/AMO BPR (Business Process Re-engineering) plan to include:
	  o New process design (in terms of workflows and actors) for providing customer services according to SLAs
	  o Communication plan
	  o Security Model
	  o Training plan
	• Design data model for SLA reporting requirement
	• Define escalation procedures
	• Define procedures/training for updating/refreshing knowledge base and customer service skills
	• Define support and technical documentation
	• Define roles and responsibilities
	• Define information to initially populate Siebel knowledgebase
	• Define pilot and production deployment plans
	• Define performance metrics
		• Requirements

Development	• Pre-populate Siebel knowledge-base with sufficient information to support initial implementation • Pilot roles and responsibilities • Conduct training • Make CRM modules and /or functionality available to Directorates • Implement workflow/escalation • Implement a support plan, and introduce support team and mechanisms • Conduct Training, produce and distribute documentation	• Design • Development, Test, Acceptance, Demo and Production environments • Acquisition of additional functionality as necessary

Phase	Major Milestones	Dependencies/Assumptions
Deployment and Maintenance	• Perform Systems-Use Audit • Correlate performance and SLAs • Continually re-evaluate data collected against SLAs and performance	• Successful pilots • Production systems • Management Procedures • System monitoring • Security certification and accreditation

Project Name:
12. Identity Management

12.1. Introduction

A key concern regarding security as well as ease of access to system resources is the management of user identities of both internal and external users and authentication and authorization to NSF resources. NSF currently has no fewer than 10 systems that contain user information about the 2000 internal NSF users and the 200,000+ users of external systems. Problems endemic in such a distributed system include the lack of authoritative source of information, duplicate entries, diminishing data integrity, inability to secure the environment, limited ability to control access to data, the inability to provide services based on personalized user preferences, increased administration and development costs.

Corporate Directory Structure/Service. NSF will continue to establish a common, "corporate directory service" that will store and manage user profiles, access privileges, desktop configurations, and application and network resource information. The tangible use of a directory service is to provide a coherent and integrated management of users and resources. It will provide NSF with a logical view of its staff and selected resources and it will provide a basis for interactions with external customers such as Sponsored Research Organizations or contracting organizations. Associated with the directory are methods of authentication and authorization. This service will help ensure appropriate access policies are followed across NSF applications, facilities, and services and enable NSF to adopt Government-wide eAuthentication services and provide better service to the scientific community. Implementation of an NSF-wide corporate directory structure is a pre-requisite to implementing the services of the Government-wide eAuthentication and other Government-wide initiatives. (Source: NSF "Infrastructure" Exhibit 300).

The NSF Target Architecture features an authoritative source of user information based on an open set of Identity Management standards and the SUN JES suite of products that will enable centrally managed and administered user identification. NSF Identity Management will be the enabling mechanism for:

- Controlling access to data and NSF resources
- Managing the identity of internal and external users (including personalization)
- Role-based authorization (i.e., access to system resources and data based on your role within or pertaining to the organization)
- Personalization/Customization based on role
- Single-sign on (only one login action necessary to access all applicable system resources)
- A single source for user information and authentication into NSF systems
- Instantly adding, deleting or modifying user information in multiple systems
- Securing the NSF computing environment

- Basis for the NSF Portal and streamlined end-user experience

NSF is currently in the process of implementing a Identity Management, Identity Management, Identity Provisioning and meta directory systems based on Sun's JES platform. In addition to providing the above services, the NSF Identity Management (and associated services) will provide the cornerstone for many other current and future technology projects (e.g., Next Generation Grants Management, Strategic Information Management, NSF Portal, Content Management, etc.)

12.2.Project Assumptions, Constraints and Critical Success Factors

Some of the key Assumptions, Constraints and Success Factors are outlined below

- SUN JES environments have been established
- LDAP schema established (including user roles)
- All internal users migrated to Directory
- Directory established as authoritative source of internal user information

12.3. Project Risk Management

There are several risks to the successful completion of this project and some of the critical ones have been identified below

NSF Risk Factor	OMB Risk Factor	Risks	Supporting Data	Like-lihood	Conse-quence/ Impact	Risk Mitigation Strategy
• Technical	• Technology	• Some existing applications will be too expensive or complicated to convert from local authentication to Identity Management	• The unknown nature of some existing applications introduces uncertainty into reprogramming for Identity Management	• Me d	• Med	• Assess the probability of successfully converting all major applications before beginning to re-program; prioritize based on best chance of success and criticality • Set expectations that some older applications may not be able to take advantage of authentication or authorization capabilities

NSF Risk Factor	OMB Risk Factor	Risks	Supporting Data	Like-lihood	Conse-quence/ Impact	Risk Mitigation Strategy
• Other	• -	• NSF's internal culture will reject/underutilize Identity Management and continue to build systems independent of Identity Management	• NSF Directorates have a history of developing stand-alone systems with overlapping functionality	• H igh	• High	• Ensure acceptance of project scope from senior management and cross-directorate groups • Ensure that IT projects initiated within directorates are in alignment with the NSF EA and follow established Technology Governance procedures • Via security policy, require that all applications needing the use of user/authentication information must use Identity Management or associated services

12.4.Stakeholders

Business Planners
IT Planners
IT Project Teams

12.5.Project Scope

The scope of this project is to define, design and implement the Identity Management system at NSF.

- Business Justification
  - The initial strategic rationale for Identity Management has already been made; additional business cases may be necessary to justify work to maintain and expand Identity Management to encompass all major NSF systems and identity management.
  - Costs and Benefits are, in part, identified as part of the business process work performed as part of the NSF Business Analysis
- Requirements Gathering and Design
  - Key stakeholders for both Identity Management and Identity Management

    - Requirements/design documentation, testing, deployment and optimization of each Identity Management sub-project (i.e., application/system)
    - Directory configuration
        - Physical
        - Schema
        - Contents
        - Meta Directory
        - Provisioning
    - Establish dependencies between Identity Management sub-projects and other areas of the EA Transition Strategy
    - Extend security model
    - Pilot Projects
- Development, Deployment and Maintenance
    - Authentication
    - Application Integration and Reconfiguration
    - Identity Management
    - Single Sign-on

12.6.Project Approach and Milestones

The table below illustrates the major milestones to be achieved in the Identity Management implementation.

Phase	Major Milestones	Dependencies/Assumptions
Business Justification	• Develop Directory Business cases o Define the business goals o Conduct a Cost-Benefit Analysis	•

Phase	Major Milestones	Dependencies/Assumptions

Requirements Gathering	• Establish comprehensive program management plans
	• Identify key stakeholders
	• Determine common data elements for user identification
	• Determine system and integration requirements
	  o Authentication with new and existing applications
	  o Application Integration and Reconfiguration
	  o Identity Management
	  o Single Sign-on
	• Determine end-user requirements for identity management, personalization & customization
		• Business justification
		• Installation and configuration of JES Identity Management

Design	• Create logical design of Identity Management schema
	• Create logical design for server and environment configuration
	• Determine meta directory configuration and provisioning
	• Extend security model to cover Identity Management and identity management
	• Establish Group/role mechanisms
	• Design pilot projects for:
	  o Authentication
	  o Application redesign
	  o New application integration
		• Requirements gathering and definition
		• Stakeholder identification
		• Identity Management requirements

Development	• Establish LDAP, schema, security • Implement meta directory and data flow rules • Establish services for identity based authentication and authorization • Establish Single/Simplified Sign-On Integration Methods • Establish Governance model, standard operating procedures and service level agreements • Knowledge transfer	• Design specifications • Technology Governance sufficient to establish project-related management procedures • Development, Test and Acceptance environments

Phase	Major Milestones	Dependencies/Assumptions
Deployment Maintenance	• Install systems as described in "Implementation" in the Production environment as appropriate • Iteratively revise requirements, design and implementation of functionality	• Successful pilots • Production systems • Management Procedures • System monitoring • Security certification and accreditation

Performance	Planned Improvements to Baseline	Actual Results
	• Users able to log in to FastLane with credentials from at least two credential service providers	• Users able to log in to FastLane with credentials from grants.gov and USDA
	• E-jacket e-authentication enables	• FY2007
	• Corporate directory implemented for authentication and authorization	• FY2007
	• Implement a corporate directory encompassing person, role, and organization data using leading technologies	• FY2007

Project Name:
13. NFS Portal

13.1. Introduction

The NSF Portal will provide single point of access and integrated web-based access to NSF applications, analytical knowledge, transactional data, and business-related information. For many applications capable of being fully integrated, the NSF Portal could provide the additional benefit of a standard framework for user-interface design. The NSF Portal, in conjunction with the NSF Directory and Identity Management Services, will provide a method for securing access to applications and for the end-user to personalize views, applications (to whatever extent possible), and other user-interface elements. Additionally, information sources are spread across many web sites and other sources. A NSF Portal will help consolidate and streamline NSF's information and provide security and personalization of the end-user experience.

13.2. Project Assumptions, Constraints and Critical Success Factors

Some of the key Assumptions, Constraints and Success Factors are outlined below

- A feasibility assessment for integrating applications into the Portal will be conducted
- Not all applications will be able to be fully integrated into the Portal (i.e., the non-integrated applications would retain their own user-interfaces, etc. but would still be accessible through the portal)
- The Portal will be based on Identity Management and Identity Management functionality
- All future applications will be developed/integrated with the NSF Portal to the greatest extent possible
- The NSF Portal will become the single point of access of all NSF applications and enterprise information

13.3. Project Risk Management

There are several risks to the successful completion of this project and some of the critical ones have been identified below

NSF Risk Factor	OMB Risk Factor	Major Risks	Supporting Data	Likelihood	Consequence / Impact	Risk Mitigation Strategy
Mission Alignment	• Business • Strategic	• NSF will still continue to develop applications independently of the NSF	• Will ultimately limit the effectiveness of the Portal • The Portal will become	• Med.	• High	• Ensure that technology governance

NSF Risk Factor	OMB Risk Factor	Major Risks	Supporting Data	Likelihood	Consequence / Impact	Risk Mitigation Strategy
		Portal	simply another application			procedures are in place • Ensure that the Rational is used in application development so as to take advantage of previously developed components
Technical	• Data/Info	• Inaccurate user information	• The Portal is heavily dependent upon accurate user information originating from the Identity Management. Inaccurate information will lead to reduced functionality and security	• Med	• High	• Ensure that change management, maintenance and quality assurance procedures are in place for Identity Management and Identity Management
Technical	• Technology Obsolescence • Technology	• Some existing applications will not be able to be fully integrated into the portal	• Older or infrequently used applications may not be fully integrated	• High	• Low	• Prioritizes the integration of applications to begin with most critical or heavily used • Socialize the fact that the portal may not provide seamless integration of

NSF Risk Factor	OMB Risk Factor	Major Risks	Supporting Data	Likelihood	Consequence / Impact	Risk Mitigation Strategy
						all applications
• Project Management	• Capability of agency to manage projects	• Failure Rates	Historically, implementations of complex, enterprise-wide applications have significant failure rates	• Low	• High	• A modular implementation approach leveraging prototypes and pilots is proposed to ensure a common understanding (and validation of assumptions) early in the process. • Adoption of standard methodologies like iterative RUP (Rational Unified Process) is also recommended.

13.4.Stakeholders

Business Planners
Institutions
IT Planners
IT Project Teams
NSF Employees
Oversight Boards

Primary Investigators
Reviewers

13.5.Project Scope

The scope of the project is to develop an Enterprise Portal at NSF. This includes

- Business Justification
  - NBF Portal business case for deployment and redesign of existing systems to be integrated
- Requirements Gathering and Design
  - Converting inside.nsf.gov functionality and information to Portal Framework
  - Identifying a list of the applications to be included through the portal
  - Developing a pilot for the portal to get the sign-off from the stakeholders
  - Providing a look and feel consistent with NSF standards for the portal
  - Identifying portal users and roles
  - Security Model
  - Pilot project development
  - Deploy development and test environments
- Development, Deployment and Maintenance
  - Integration of existing applications with portal
  - User roles and customization/personalization options
  - Performance measures
  - User interface design
  - Pilot tests
  - Production deployment

13.6.Project Milestones

The table below illustrates some of the major milestones to be achieved in the Enterprise portal's implementation.

Phase	Major Milestones	Dependencies/Assumptions

Business Justification	• Develop Portal Business case
	  ○ Define the business goals
	  ○ Define the requirements of the Portal Project
		• Sun JES environments established
		• Identity Management successfully implemented

Phase	Major Milestones	Dependencies/Assumptions
Requirements Gathering	• Identify Portal Users and their role	

	• Determine which applications can be fully integrated/partially integrated and prioritize
	  o Begin application redesign as appropriate
	• Determine user interface requirements
	• Determine content update and maintenance procedures
	• Determine Portal features to be deployed
	  o Personalization
	  o Categorization and publishing
	  o Search and navigation
	  o Notification and delivery
	  o Collaboration and workflow
	  o Portal directory
	• Determine requirements for meta data management, and portal administration
	• Determine security requirements	

Design	• Design and approve user interface • Design user profiles • Design training and documentation	Requirements
Development	• Integrate the portal's services into NSF's overall infrastructure • Move existing information (e.g., inside.nsf) to portal framework • Integrate applications into portal interface • Move existing applications to portal framework • Implement security services: o E.g., User Authentication, mechanisms and privileges • Pilot various user groups to determine accuracy of group roles/privileges	• Development, Test, Acceptance and Demo environments

Phase	Major Milestones	Dependencies/Assumptions
Deployment and Maintenance	• Validate the design by user prototyping • Deploy the portal to user population	• Successful pilots • Production systems • Management Procedures • System monitoring • Security certification and accreditation

Project Name:
14. Enterprise Management Systems

14.1. Introduction

The NSF target architecture is characterized by tools and strategies to completely "know" about and monitor all computing components ranging from the physical network, servers and OS's to desktops, application and virus definitions; tools that provide these services are known as Enterprise Management Systems (EMS). Currently, the NSF computing environment has a number of tools that provide varying levels of enterprise management for several computing components but without an integrated view into the entire computing environment. NSF's Target Enterprise Architecture will provide an integration plan and management processes for providing a complete picture and history of the NSF computing environment using existing tools. The resulting technology structure will mean better performance, less downtime, better security and better asset control than available in the current configuration.

14.2. Project Assumptions, Constraints and Critical Success Factors

Some of the key Assumptions, Constraints and Success Factors are outlined below

- EMS data will be regularly and expeditiously collected and analyzed
- EMS data and actions taken as a result of those data will be considered holistically (that is, EMS systems and responses will take into account relations to and effects on other EMS systems)
- Management of EM systems and processes will be managed centrally under one branch or collaboratively under several branches; individual EM systems will NOT be managed singularly under each branch
- EMS strategy, processes and tools will follow industry standards to the greatest extent possible
- Roles, responsibilities and ownership for each tool and function should be clearly defined
- Appropriate training will be provided

14.3.Project Risk Management

There are several risks to the successful completion of this project and some of the critical ones have been identified below

NSF Risk Factor	OMB Risk Factor	Risks	Supporting Data	Likelihood	Consequence/ Impact	Risk Mitigation Strategy
• Mission Alignment	• Business	• Major systems are not monitored by any EMS systems (or inadequate systems) and therefore are at risk	• DIS, DAS and Directorate systems have varying levels of enterprise management system oversight	• High	• High	• Consolidate the development, operations and maintenance of all major systems under DIS
• Project Management	• Organizational and change management	• Lack of clearly defined responsibilities and ownership of systems	• EMS tools are spread across several branches within DIS with multiple owners and purposes	• High	• High	• Consolidate management and operations of EMS tools under one branch or coalition of managers

NSF Risk Factor	OMB Risk Factor	Risks	Supporting Data	Likelihood	Consequence/ Impact	Risk Mitigation Strategy
• Technical	• Data/info	• Impacts of performance data collection may not be measurable	• NSF applications and data cut cross a wide spectrum of technologies	• High	• High	• Ensure that all performance data is linked to a service-level agreement that is based on customer expectations and/or policy
	• Reliability of the system • Organizational and change management	• EMS systems do not integrate to the extent that information from across domains (e.g., performance, security, capacity) can be used to make an integrated risk assessment	• EMS tools are spread across several branches within DIS with multiple data bases, interfaces and purposes	• High	• High	• Consolidate management and operations of EMS tools under one branch or coalition of managers • Prioritize consolidating systems and related data in order to support cross-domain policies, SLAs and business processes
	• Other	• Business processes used to act on EMS data are not modified to reflect capabilities of reconfigured EMS tools	• EMS tools, while reconfigured to cross domains, are not supported by business processes to take advantage of new configuration	• Medium	• High	• Ensure that business processes are such that they can accommodate new data; tie business processes to SLAs
	• Technology	• EMS Data warehouse not coordinated with or compliant with enterprise architecture	• EMS tools are not consolidated and do not adhere to data, security or enterprise architecture	• Medium	• High	• Ensure that EMS systems are monitored and planned in accordance with the Technology Governance Framework and Target Enterprise Architecture

14.4.Stakeholders

IT Planners
IT Project Teams

14.5.Project Scope

The scope of this project is to define, design and implement the EMS system at NSF.

- Business Justification
  - Strategic rationale for EMS has been established as part of the EMO work performed as part of the business analysis
  - Costs and Benefits already identified as part of the EMO work performed as part of the business analysis
- Requirements Gathering and Design
  - Establish comprehensive program management plans to ensure clarification of project scope, parameters and well defined communication and coordination with team members
  - Identify key stakeholders
  - Establish requirements/design documentation, testing, deployment and optimization of each EMS application
  - Security model
- Development, Deployment and Maintenance
  - Establish standardization for EMS Configuration, Change Management and Service Level Agreements
  - Establish Capacity, Availability and Continuity Management procedures and SLAs
  - Integrate EMS tools and data (including testing and rollout activities)
  - Create a network hierarchy with BMC as shared fault management repository for consolidated reporting and event correlation

14.6.Project Approach and Milestones

The approach to implementing an Enterprise Management System will be phased. Phase I will focus on establishing procedures and consolidating and integrating EMS tools and data. Phase II will focus on providing expanded reporting capabilities possibly based on the Strategic Information Management Project.
The table below illustrates the major milestones to be achieved in the Enterprise Management System implementation.

Phase	Major Milestones	Dependencies/Assumptions
Business Justification	• Develop Business case - Define the business goals - Conduct a Cost-Benefit Analysis	• Consolidate responsibilities for enterprise management under one branch or coalition of managers

Phase	Major Milestones	Dependencies/Assumptions

Requirements Gathering	• Establish comprehensive program management plans
	  ○ Customization and Integration
	  ○ Testing
	  ○ Rollout and Transition
	• Identify key stakeholders
		• Business justification
		• Funding availability

Design	• Identify system interfaces for each EMS system by developing specifications of:
	  ○ Target EMS state
	  ○ Revised Business process maps
	  ○ Verification of configuration information
	  ○ Optimization
	  ○ Implementation plan
	• Create a catalog of functional and technical services definitions per the enterprise architecture for each application
	• Establish SLAs based on user requirements and policy
	• Establish requirement/design documentation for each EMS application and/or FCAPS area based on SLAs
	• Adapt and finalize the data conversion strategy
	• Conduct and independent evaluation of future EMS functionality
		• Requirements definition
		• Stakeholder identification

Development	• Develop a pilot implementation of critical tasks • Extend security model for EMS • Consolidate data and UIs from existing systems • Configure systems to match requirements as defined in the SLAs • Provide on-the-job training programs for operators and integrators • Refine business process changes • Implement initial reporting capabilities • Ensure appropriate audit records are created for tracking data changes • Establish EMS continuity processes	• Design specifications • SLAs • Data warehouse

Phase	Major Milestones	Dependencies/Assumptions
Deployment and Maintenance	• Install the EMS system in the Production environment • Compare collected and reported information with SLAs and revise SLAs based on feedback • Restructure the repository and content on a periodic basis based on SLA revisions • Maintain document control for EMS artifacts	• Consolidated system views • Production systems • Management Procedures • System monitoring • Security certification and accreditation

Project Name:
15. Telework

15.1. Introduction

This section will be updated pending the review and integration of NSF's recently implemented Telework Policy.

15.2. Project Assumptions, Constraints and Critical Success Factors

15.3. Project Risk Management

15.4. Stakeholders

Business Planners
IT Planners
IT Project Teams
NSF Employees

15.5. Project Scope

15.6. Project Approach and Milestones

The table below illustrates the major milestones to be achieved in the Telework implementation.

Phase	Major Milestones	Dependencies/Assumptions
	○	●

Project Name:
16. Enterprise Architecture

16.1. Introduction

This section includes the planning, research, development and communication of NSF's Enterprise Architecture, in other words, the Program Plan for the Enterprise Architecture effort currently part of the NSF Business Analysis. The meta-information included here describes the steps necessary to develop EA baseline and target information, the Technology Governance Framework, the Enterprise Architecture Transition Strategy and the IT Sequencing Plan. Please see Section 17: Technology Governance Framework Program Plan for specifics about implementing NSF EA Governance Plan. See also, *The NSF Technology Governance Framework section on EA Governance*.

NB: It is important to note that there is distinction between this project plan and the NSF Sequencing Plan, which is represented by this document as a whole: NSF Sequencing Plan represents the subset of technology projects necessary to attain the NSF Target EA; this EA Program Plan represents the steps necessary to achieve the tasks associated with the management and execution of the EA project.

16.2. Project Assumptions, Constraints and Critical Success Factors

Some of the key Assumptions, Constraints and Success Factors are outlined below:

- The EA project will continue to receive support from NSF Senior Management
- NSF will continue to support EA beyond the duration of the NSF Business Analysis task under which the EA effort is currently being funded

16.3. Project Risk Management

There are several risks to the successful completion of this project and some of the critical ones have been identified below

NSF Risk Factor	OMB Risk Factor	Risks	Supporting Data	Like-lihood	Conse-quence/ Impact	Risk Mitigation Strategy
• Mission Alignment	• Strategic	• The Enterprise Architectu re will become obsolete	• EAs, when not continually updated and used in the organization's decision-making process become inaccurate	• Med	• High	• Ensure that the EA Management sections Technology Governance Framework are implemented
• Project Planning	• Project Resources	• The Enterprise Architectu re project funding will remain uncertain	• The NSF Business Analysis (under which the EA project is authorized) has operated at 55% of it's original funding rate	• High	• Med	• Continue to optimize products and recommendations to focus on high-priority needs
• Technical	•	• EA Tool will not contain enough/th e right informatio n to support business decisions	• All data needed for business decisions are not known at this point	• Med	• Low	• Ensure that the EA tool is flexible enough to meet current needs and be expanded to meet future needs

16.4.Stakeholders

Business Planners
IT Planners
IT Project Teams

16.5.Project Scope

The scope of this project is to define, design and implement the EMS system at NSF.

- Business Justification
    - The business case for the EA project has been established under the NSF Business Analysis
    - Continue to refine the business case for incorporation into the yearly submission of the OMB 300

- Requirements Gathering and Design
  - Establish baseline architecture
  - Establish target architecture
  - Perform Gap/Redundancy analysis
  - Develop EA Transition Strategy and Sequencing Plan
  - Refinement of EA plan
  - Optimization of resources to provide highest-priority deliverables and services
  - Selection, configuration and population of an automated COTS/GOTS EA tool
- Deployment and Maintenance
  - Implementation of EA tool in test and production environments
  - Data population and maintenance
  - Training and technical & end-user documentation

16.6.Project Approach and Milestones

The table below illustrates the major milestones to be achieved in the EA implementation.

Phase	**Major Milestones**	**Dependencies/Assumptions**
Business Justification	• Develop EA Business cases	•
Requirements Gathering	• Establish technology, business process, data and standards baselines • Develop recommendations based on baselines analysis • Integrate NSF COTS security requirements	• Business justification •

Design	• Create target technical architecture
	• Develop gap/redundancy analysis
	• Integrate architecture with Business Process and Human Capital recommendations
	• Develop EA Transition Strategy
	• Develop Information Technology Sequencing Plan
	• Select automated EA COTS/GOTS tools
	  o Define high level requirements for an EA tool
	  o Conduct a preliminary market analysis to identify tool vendors
	  o Request product demos by vendors
	  o Establish selection criteria
	  o Issue RFP
	  o Choose the tool based on the selection criteria
		• Requirements gathering and definition
		•

Development	• Install and configure automated EA COTS/GOTS tool • Develop the EA meta model including containers for objects, the objects themselves, relationships and attributes. • Establish relationships between objects • Develop the model for the Target Architecture • Establish reporting standards including views for baseline and target EA models and Gap/redundancy analysis through custom display criteria • Populate EA tool with baseline, target, financial and implementation data • Communicate/train staff on EA concepts and plan	• Design specifications • Test environments • EA Tool
Deployment and Maintenance	• Install EA tool in Production • Develop a governance policy to manage data changes to the information in the tool • Develop reporting capabilities to share the information and facilitate better senior management decision making	• Production systems • Management Procedures • System monitoring • Security certification and accreditation

Performance	Planned Improvements to Baseline	Actual Results

	• Provide basis for Target Enterprise Architecture and implementation plan	• Successful completion of the Baseline Architecture in compliance with the FEA
	• Establish compliance with Federal Enterprise Architecture throughout the IT Planning and Control Process	• Successful completion of the Baseline Architecture in compliance with FEA
	• Development of implementation plan for Target Architecture	• Successful completion of an Implementation Plan in compliance with the FEA
	• Procurement and deployment of Enterprise Architecture tool	• Successful completion of transitioning 100% of applicable Enterprise Architecture data into Enterprise Architecture tool.
	• Increase the number of Implementation Plan work streams that are deployed.	• FY06 - 3 of 11 of the work streams from the Transition Strategy are deployed in accordance with agency priorities and established plans: baseline plus Technology Governance Framework, Directory Services.
	• Increase the number of Implementation Plan work streams that are deployed.	• FY07 - 5 of 11 of the work streams from the Implementation Plan are deployed in accordance with agency priorities and established plans: baseline plus Portal, Enterprise Management System.
	• Increase the number of Implementation Plan work streams that are deployed.	• FY08 - 7 of 11 of the work streams from the Implementation Plan are deployed in accordance with agency priorities and established plans: baseline plus Strategic Information Management and Content Management.
	• Increase the number of Implementation Plan work streams that are deployed.	• FY09 - 9 of 11 of the work streams from the Implementation Plan are deployed in accordance with agency priorities and established plans: baseline plus IPv6 and Customer Relationship Management.

Project Name:
17. Technology Governance Framework

17.1. Introduction

In order to effectively manage the IT resources at NSF a Technology Governance Framework (TGF) has been completed and submitted to NSF by the NSF Business Analysis Team. The TGF identifies roles and responsibilities, processes and tasks associated with effectively managing technology investments from three perspectives:

- EA Management and Standards
- Capital Planning and Investment Control (CPIC)
- Performance Management and Risk Management

In March 2005 the CIO instituted the Chief Information Officer Advisory Group (CIOAG) with the following focus area:

- Capital Planning and Investment Control: selecting, managing, and evaluating IT investments
- Performance Management and Risk Assessment: assessing the health of an IT investment by evaluating proposed project outcomes against a project's actual results, and the analyzing, prioritizing and mitigating events that might impact an IT investment
- Enterprise Architecture (EA) and Technology Standards: evolving and managing the NSF EA as well as evaluating, adopting, and managing NSF technical standards

The CIOAG will be supported by The NSF EA Working Group and CPIC team.

17.2. Project Assumptions, Constraints and Critical Success Factors

Key Assumptions, constraints and success factors are outlined below

- The implementation of the TGF is supported by the senior stakeholders or decision makers
- NSF will manage all processes with regards to the TGF on an annual basis on a continuous basis
- The TGF has been vetted prior to the start of the implementation and there is consensus on its policies and guidelines
- TGF concepts on IT governance will be socialized before implementing
- It is assumed the Office of the CIO and the Enterprise Architect have the available resources and time to implement the governance framework

17.3.Project Risk Management

There are several risks to the successful completion of this project and some of the critical ones have been identified below

NSF Risk Factor	OMB Risk Factor	Risks	Supporting Data	Likelihood	Consequence/ Impact	Risk Mitigation Strategy
Mission	• Technical Obsolescence	• Absence of technology standards	• There are few accepted enterprise-wide standards or repeatable methods	• High	• High	• Review the standards management section of the TGF and the change management processes recommended in the TGF
	• Strategic	• Identifying and managing risk	• Absence of risk identification and developing risk mitigation strategies have lead to higher management burden for projects of all sizes	• High	• High	• Introduce a project management office to view all projects at a high level and strategize to identify risks and develop mitigation strategies • Introduce a quarterly review cycle for all projects
	• Business • Strategic	• Unknown project performance and success factors	• Performance of IT projects is not consistently measured and reported at regular intervals	• High	• High	
	• Strategic	• Inaccurate information about the Enterprise	• The EA effort at NSF will become a static effort in the absence of an EA management and guidance from top level management	• High	• High	• Bring together a steering committee which integrates the three management tasks addressed in the TGF • Ensure that implementation of the TGF is supported by the top management
Project Management	• Organizational and change management	• Employee resistance to change	• The implementation of the TGF will have a significant impact on the business processes associated with the development and integration of technologies	• High	• High	• Develop a strategy to socialize the concept of technology governance • Consider running frequent training sessions for employees who participate in tasks related to EA, CPIC and project management

17.4.Stakeholders

Business Planners
IT Planners
IT Project Teams

17.5.Project Scope

The scope of this project is to implement technology governance across NSF.

- Planning and Design
  - TGF verification
  - Organizational constructs for technology management

- Implementation
  - Establishing organizational structures needed to implement the TGF
  - Key personnel and committees to champion the implementation the TGF
  - Communication and socialization of TGF concepts and processes
  - Timeline, documentation and training

17.6.Project Approach and Milestones

The table below illustrates the major milestones to be achieved in the technology governance implementation.

Phase	Milestones	Dependencies
Planning and Design	Identify sub-tasks critical for managing technology per the TGF documentation • Enterprise Architecture • CPIC • Risk management and performance measurement Integrate TGF activities with activities of the Continuous Improvement Program	
Implementation	• Identify organization structure to implement the TGF for each management area identified in the TGF • Establish a Change Control Board for DIS	• Senior management supports the implementation of the TGF and is willing to implement it

Phase	Milestones	Dependencies
	• Expand Change Control Board to all of NSF as appropriate • Develop a communication plan • Institute a process to develop the overall technology governance framework by establishing committees and teams (e.g., CIOAG) as identified as a part of the TGF document • Conduct initial meetings to develop the charter, roles and responsibilities and schedule of meetings for the EA and CPIC Working Groups responsible for implementing the TGF • Calendar" mentioned in the TGF. • Ensure all tasks are identified as a part of the annual calendar and roles and responsibilities are assigned to employees	

Project Name:
18. IPv6 Implementation

18.1. Introduction

IPv6 is the latest Internet Protocol (IP) designed as an evolutionary set of improvements to the current IP version 4 (IPv4). The Internet Engineering Task Force (IETF) has produced a comprehensive set of specifications that define IPv6 and, though IPv6 is based on much-needed enhancements to IPv4 standards, it is often looked upon as "just another protocol". Instead, IPv6 should be viewed as a series of broad retooling projects with near term objectives and long-term goals that could extend 5-10 years into the future.

IPv6 provides many improvements to the IPv4, the most obvious of which is that addresses are lengthened from 32 bits to 128 bits. This extension will accommodate more than enough addresses anticipated for the Internet and the number of devices that will need to connect.

Other equally important improvements are:

- Hierarchical addressing
- Native security
- Improved confidentiality and privacy
- Integrated quality of service (QoS)
- Auto-configuration
- Mobile computing support
- Multicast
- Any-cast
- Network route aggregation

On August 2, 2005, the Office of Management and Budget (OMB) issued a memorandum directing all agencies to transition their network backbone infrastructure to IPv6 by June 2008, setting several milestones along the way. These include:

- Ist Inventory Assessment Report by November 15, 2005
- IPv6 Transition Progress Report by February 28, 2006
- IPv6 Transition Plan by February 28, 2006
- Impact Analysis Report by June 30, 2006

- 2nd Inventory Assessment Report by June 30, 2006

While the move to IPv6 will be a major leap forward for the Internet and the enterprises that rely on internetworking technology, there is no consensus at this time among industry experts on the best method for transitioning to the new protocol. IEFT protocol designers have estimated that most network appliances (hosts and routers) can be upgraded to IPv6 in an incremental manner, so wholesale replacement of infrastructure and large-scale obsolescence is unlikely. Transition mechanisms are being designed to allow flexibility during the upgrade process and, consequently, organizations will have to arrive at a method after careful examination of those options.

Given that the migration to IPv6 will affect millions of networks, it is clear that there will be an extended transition period with many dimensions and challenges. Among the most pressing organizational questions:

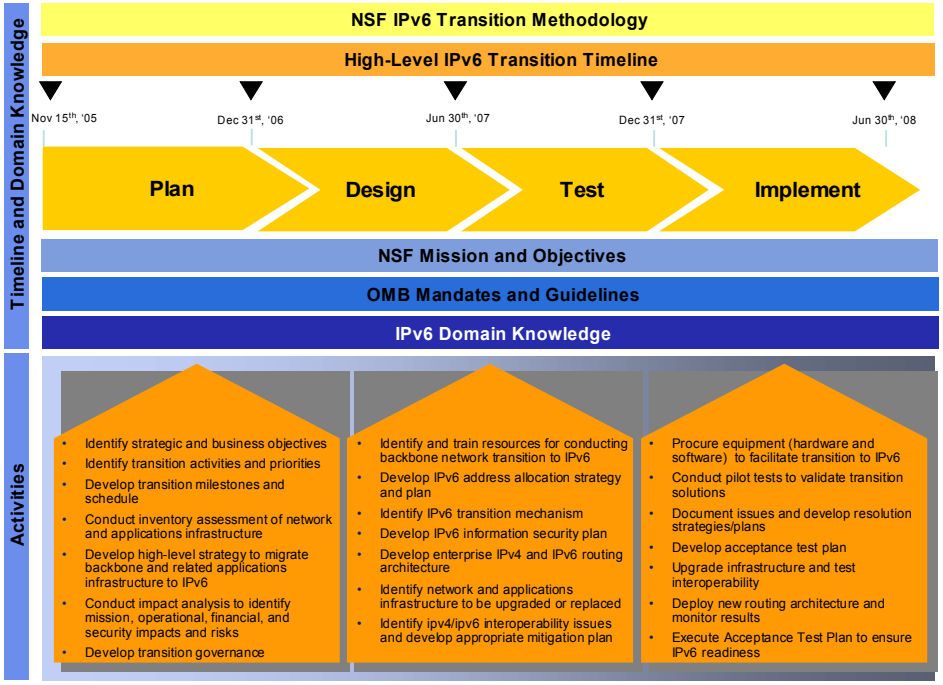
- How IPv4 and IPv6 will work together on the NSF network?
- Which applications can make use of IPv6 features and, of those that cannot, which applications must either be modified or retired?
- Which network appliances (e.g., routers, switches, bridges) are compatible with IPv6 and which are not?
- How network services such as DNS and DHCP may have to be modified/upgraded?
- What costs and risks are likely to be encountered?
- Will a complete transition to IPv6 be beneficial to the organization and its stakeholders?

In addition, there are several transition related concerns, which includes:

- Impact on key ongoing initiatives
- Re-deployment of staff from other key initiatives to support the IPv6 transition effort
- Lack of IPv6 expertise and funding for training staff on IPv6
- Lack of budget or resources to create a dedicated IPv6 Transition Office

To ensure successful deployment of IPv6 on the Foundation's network, NSF has adopted the following transition methodology:

Figure 8: IPv6 Transition Methodology



It should be noted that, as mandated by OMB, by June 30, 2008, the NSF network backbone must only be capable of supporting IPv6. While NSF will strive to actually deploy IPv6 within its network backbone by that date, the protocol will be phased in throughout the rest of the network subsequent to the June 30, 2008 deadline, and IPv4 will continue to be used in conjunction with IPv6 for several more years.

18.2.Project Assumptions, Constraints and Critical Success Factors

- IPv6 features and IPv6 based applications are anticipated to be desirable and will therefore be incorporated into the NSF Target Architecture, however, transition of application and infrastructure will be evaluated on a case-by-case basis
- All new technology acquisitions will be evaluated for compatibility/compliance with IPv6
- Acquisition and implementation of new technologies is dependent upon availability of appropriate resources
- An enterprise-wide transition to IPv6 could take as long as 7 – 10 years

- "Transition to IPv6" means fully supporting the base protocol suite. It does not necessarily mean abandoning support of IPv4, although that may happen over time
- IPv6 and IPv4 will co-exist on the same physical network for an undetermined period of time
- Some applications may have to be modified or retired before a complete transition to IPv6 can be made
- The transition to IPv6 will involve upgrading or reconfiguring network hardware, network services, and network security systems

18.3.Project Risk Management

There are several risks to the successful completion of this project and some of the critical ones have been identified below.

NSF Risk Factor	OMB Risk Factor	Risks	Supporting Data	Likelihood	Impact	Risk Mitigation Strategy
• Mission Alignment	• Strategic and Business	• NSF's core business of interacting with the Scientific Community could be compromised due to technological implications of IPv6	• NSF's core mission is to interact with the Academic and Scientific Community and provide grants for the purpose of scientific research. A key component to that interaction is the efficient and reliable transfer of communications and information. IPv6 requires that all parties take some responsibility for the transition in a coordinated manor.	• High	• High	• Ensure that the project take a phased implementation approach • Ensure appropriate levels of communication
• Project Management	• Capability to manage the project	• Project scope will not be able to be controlled	• IPv6 scope is large and will affect almost every computing and network service currently in use	• High	• High	• Ensure that technology governance procedures are adopted and that the project take a phased implementation approach
	• Dependencies and interoperability between projects	• Dependencies between implementation of IPv6 and other projects will not be able to be maintained	• IPv6 will affect many computing and network service currently in use at NSF at a very fundamental level. Every application and network device will need to be tested for compatibility; this is especially true for custom and legacy applications/systems	• High	• High	

NSF Risk Factor	OMB Risk Factor	Risks	Supporting Data	Likelihood	Impact	Risk Mitigation Strategy
• Technical	• Data/Info	• The infrastructure and application portfolio will not be sufficiently flexible to accommodate IPv6 thereby leading to wholesale technological replacement	• Every application and network device will need to be tested for compatibility; this is especially true for custom and legacy applications/systems	• High	• High	• Ensure that the project take a phased implementation approach
	• Data/Info	• Data transfer and communication will be at risk while networks and applications are being transitioned	• The complete transition to IPv6 is dependent upon all networks on the Internet supporting IPv6.	• High	• High	

18.4.Project Scope

The scope of this project is to deploy IPv6 on the Foundation's network backbone only. This involves planning, network design, pilot testing, and production deployment.

- Business Case
  - Input into the strategic rationale for IPv6 at NSF
- Planning
  - Scheduling
  - Inventory assessment
  - Impact analysis
  - Training requirements
- Design
  - IP address allocation
  - IPv4/IPv6 interoperability
  - Routing
  - Security
- Testing
  - Equipment procurement/upgrade

- Pilot deployment
- Issue mitigation
- Acceptance test planning

- Implementation
  - Continued equipment procurement/upgrade
  - Production deployment
  - Internet routing configuration
  - Acceptance testing

18.5.Project Approach and Milestones

The table below illustrates the major milestones to be achieved in the IPv6 Transition Plan.

Phase	Major Milestones	Dependencies/Assumptions
Plan	• Complete Second Inventory Assessment • Complete Impact Analysis and Risk Mitigation Strategies • Develop a high-level transition strategy	Every risk shall have a mitigation plan
Design	• Determine IP addressing schema • Determine equipment to be replaced or upgraded • Develop network security plan	NSF will be able to upgrade equipment as necessary
Test	• Conduct a non-disruptive pilot test • Develop an Acceptance Plan	
Implement	• Upgrade equipment as necessary • Enable IPv6 routing • Complete Acceptance Testing	

Project Name:
19. Infrastructure

19.1. Introduction

NSF's physical and IT-enabled business infrastructure supports the operation of mission-essential IT applications and Office Automation activities, including its Telecommunications requirements and Security Program. NSF has established an overall program for managing all Infrastructure, Office Automation, and Telecommunications (I/OA/T) projects to ensure that these investments are integrated and managed across NSF in an overall strategy consistent with NSF's strategic vision and enabling both project and technical consolidation and integration across NSF

19.2. Project Assumptions, Constraints and Critical Success Factors

We assume a life cycle of ten (10) years for Infrastructure, Office Automation, and Telecommunications. This assumes that 2004 is the first year and 2013 is the last year. However, this investment is expected to continue operation for the foreseeable future

19.3. Project Risk Management

NSF Risk Facfor	Risks	Like-lihood	Current Status	Strategy for Mitigation
Schedule	Risk that the project will not meet the defined schedule	Low	We conducted regular meetings with PMs and contractors to identify and mitigate risks.	The technical team closely monitors the schedule to ensure quality results in a timely manner.
Initial Costs	Risk that the initial costs are not within budget parameters	Medium	Project is in steady state	Frequent project reviews, financial reviews and status reports
Life Cycle Costs	Risk that the maintenance costs will exceed expectations.	Medium	Project is in steady state	The past and current maintenance costs are known. Additional regulations and requirements are reviewed and managed to plan future maintenance costs.
Technical Obsolescence	Risk that the project will not have adequate structures in place to	Medium	We have upgraded voice mail to the newest version; upgraded DBMS and DB server OS to latest version.	Technical management and staff stay current on operating hardware, software and communications.

	assure currency of operating hardware, software and communications			
Feasibility	No risks identified	Low	Project is in steady state	N/A
Reliability	Risk that the project will not be highly reliable or will be unable to quickly adapt to regulatory or agency mission changes	Low	Project is in steady state	The project reliability is managed by the technical staff and monitored closely by management. Reliability is a key consideration driving technology refresh actions.
Dependencies and Interoperability	Risk that the project will not be adequately integrated with internal and external systems	Low	Project is in steady state	Members from both applications and infrastructure teams conduct planning and deployment sessions to ensure the appropriate integration.
Surety (Asset Management)	Risk to assets	Low	Project is in steady state	Infrastructure management (IT, facilities, property) responsibilities are managed in accordance with current practices and requirements.
Monopoly on Future Procurements	Risk that selection will limit ability of other projects because of inability to integrate selected product	Low	Reviewed cost benefit of operational improvement and selected products integrate with current architecture.	This project continues to be reviewed for cost benefits related to business IT solutions and operational improvements.
Agency Capability to Manage Project	Risk that appropriate resources do not or will not be available to ensure project is implemented effectively	Low	Project is in steady state	Resources are cross-trained to limit the probability that the loss of any resource will adversely impact the agency's ability to manage the project.
Overall Risk of Project Failure	Evaluate on going risk during project milestone implementation	Medium	Projects under go periodic Project Review sessions during the life cycle	Frequent project reviews, status reports and testing.
Organizational and Change Management	Risk that appropriate documentation and change tracking will not be effective	Low	We conduct training, IT specialist meetings, and document and revise operating procedures regularly. Periodic Readiness Reviews are conducted by senior management.	NSF has devised and put in place Patch and Change tracking procedures that the contractors/ service providers meet.

Security	Risk that appropriate security criteria will not be met	Low	We track all security program and system POAM actions weekly at the division's weekly security meeting.	NSF has devised and put in place appropriate security procedures that contractors/ service providers are required to meet.
Business	Risk that the failure to ensure a common understanding of the project's business change objectives and requirements among senior business managers and the project management team.	Low	Project is in steady state	Regular status meetings assure senior business management and technical management communication and interaction
Data/Info	Risk that data/info will be lost or compromised	Low	Project is in steady state	NSF has in place appropriate data retention/ assurance procedures that contractors provide.
Technology	Risk that the technology will not meet the agency's needs	Low	Project is in steady state	The infrastructure operates effectively to meet the current business requirement and is in a constant of review and improvement to satisfy the corporate requirements.
Strategic	Risk that NSF management guidelines, procedures and funding arrangements will not allow the project to be continued until the end of its lifecycle.	Low	Project is in steady state	Regular status meetings assure senior business management and technical management communication and interaction
Privacy	Risk that privacy rules will not be maintained or compromised	Low	Project is in steady state	NSF has in place procedures to ensure that privacy is maintained and that related current law and regulations are adhered to
Project Resources	Risk that there are not enough resources	Medium	Project is in steady state	Regular status meetings assure senior business management and technical management communication and interaction

19.4.Stakeholders

Business Planners
IT Planners
IT Project Teams

19.5.Project Scope

19.5.1.Continued improvements to NSF's Security Program

NSF's top management places significant priority on information security initiatives to ensure adequate protection of resources used to promote advances in science and engineering. NSF is focused on assuring that infrastructure and critical assets are appropriately protected while maintaining an open and collaborative environment for scientific research and discovery. Many initiatives have been put into place to continually improve NSF's security posture.

NSF's comprehensive, agency-wide ITS program encompasses all aspects of information security. This includes improving network security, incident response and detection, establishing a management structure to coordinate NSF-wide IT security activities, certification and accreditation of all major systems, establishing and implementing security policies, procedures and plans, performing IT contingency planning and disaster recovery testing as part of continuity of operations planning, conducting IT security training for NSF staff and contractors, supporting the FISMA/FISCAM audit and the FISMA review for security assessments, plans and controls, automating vulnerability assessments, and supporting the security responsibilities of the Office of the CIO.

19.5.2. Enhancements and initiatives to improve operational efficiency

Hardware improvements, technology refreshment and technical upgrades approved through the agency's IT investment planning and management process are needed as part of the continuing effort to meet Federal mandates, improve response times, replace outdated equipment, enhance system reliability and position NSF to introduce new capabilities.

Key investments needed to sustain and improve the NSF infrastructure and ongoing operations include:

- Central Computer Facility Infrastructure. Provide additional hardware and software to meet the emerging Federal Enterprise Architecture standards; provide new technological capabilities; refresh and replace aging systems (especially servers) to improve reliability, performance and stability; upgrade and provide redundancy for the production environment; improve the system performance management and monitoring environment; upgrade the software and tools used in the computer facility; support the application development environment; and provide new infrastructure to support data center functions.

- LAN, E-Mail and Telephone Infrastructure. Provide necessary upgrades and technology refreshment to offer new capabilities and improve response times, reliability, and availability of the network and electronic mail systems; refresh, upgrade and provide greater redundancy for the LAN servers and network infrastructure; develop wireless capabilities; and support for telecommuting; implement upgrades to the NSF firewall; enhance desktop technologies (video on demand, Web broadcasts, streaming video, etc.); and provide additional support for the Storage Area Network (SAN) data storage.

- Enterprise Resource Planning and Management. Initiate implementation of an integrated set of ERP capabilities to support all aspects of IT resource management including application life-cycle management, change management, network monitoring, automated asset management, and patch management. Provide automated hardware and software asset inventory and discovery services and identify non-standard IT installations and potential security vulnerabilities as a method to improve security. Replaces an outdated inventory and software distribution tool.

- Improved Configuration and Life Cycle Management. Implement and provide support for tools (initially deployed in FY02) to manage and improve software life cycle activities, addressing software engineering standards, program management, quality assurance, testing, and configuration management. Also included are tools to manage the inventory and configuration of desktops to facilitate routine problem resolution.

- Improved Data Storage Management. Provide the capability to retain old, infrequently used, but needed files while reserving high-speed devices for active, frequently accessed files. This will enable NSF's scientific community improved access to critical knowledge, improve performance and speed of access, and decrease costs of high-speed storage in the long term.

- Improved Communication, Networking, and Videoconferencing Capabilities. Increase capacity, reliability, and redundancy for communication, networking, and videoconferencing services and capabilities. Address wireless technologies and capabilities, web broadcasts, and related technologies to facilitate collaborative activities with other organizations and to decrease program oversight travel requirements. Increase inter-governmental collaboration via video-conferencing and improve post award management among NSF customers.

19.5.3.Day-to-Day Operational Support for Infrastructure, Office Automation, and Telecommunications

Day to day operational support requires NSF to acquire and deploy industry-standard tools necessary to securely manage a complex information infrastructure and support Government-wide eGov initiatives. These include software configuration management and testing tools, performance-monitoring tools, and call center software tools to support the tracking of customer service requests. Continued implementation of critical investments is needed in hardware, software, and tools necessary to manage and operate an infrastructure that can support NSF's electronic business processes.

Security is a high priority for NSF, and potential threats to the security of NSF's IT infrastructure are taken seriously. Therefore, maintaining a balanced and proactive security program, including 24x7 intrusion detection services, internal and external penetration tests, disaster recovery tests, and additional operational and technical security controls is essential to protect NSF's operations and investment. Redundancy and backup for critical services such as major systems production environments, email, and Internet access ensure NSF has the capability to recover from a contingency event. Periodic testing of NSF's Disaster Recovery Plan

and Continuity of Operations Plan (COOP), including participation in Government-wide exercises such as the May 2004 "Forward Challenge" ensure preparedness and awareness of operations support staff.

Tools to improve and manage software lifecycle activities, address software engineering standards, program management, quality assurance, testing and configuration management are important for a robust infrastructure. Tools already implemented and deployed to manage software lifecycle activities require support and continued investment in a growing and complex environment. Additional tools will be added to improve program management and provide increased standardization and consistency of infrastructure services.

19.6.Project Approach and Mileston - Performance

Performance	Planned Improvements to Baseline	Actual Results
	• Complete 100% of FY04 FISMA tasks	• Completed 100% of all security POAM milestones.
	• Provide 99.9% service availability	• Service available 99.9%
	• Provide 99.9% office automation and telecommunications availability	• Service available 99.9%
	• Provide 99.9% network availability via wireless	• Wireless service available 99.9%
	• Deploy latest DAT files to 99% of desktops	• 99% of desktops have current DAT files deployed
	• Deploy 90% of OS critical patches	• 90% of critical patches deployed to OS
	• Maintain a minimum 99.9% availability	• Service available 99.98% (data available through July 2005)
	• Establish provisioning of user accounts	• This performance metric will be moved to FY06 due to budget constraints in FY05.
	• Complete 100% FISMA POAM actions	• Completed all FISMA POAM actions
	• Improve technical controls (IDS, patch & firewall security)	• 100% IDS signatures updated; 90% patch deployment; 90% of router/firewall software updated
	• Scanning – conduct 100% scan of all assets per month	• Completed monthly scan of all network attached devices
	• Establish provisioning of user accounts	• FY06
	• Complete 100% FISMA POAM actions	• FY06

Performance	Planned Improvements to Baseline	Actual Results
	• Deploy 90% of OS critical patches	• FY06
	• Scanning – conduct 100% scan of all assets per month	• FY07
	• Complete 100% FISMA POAM actions	• FY07
	• Scanning – conduct 100% scan of all assets per month	• FY07
	• Provide 99.9% service availability	• FY07
	• Provide 99.9% office automation and telecommunications availability	• FY07
	• Replace non-IPv6 equipment (begin)	• FY07
	• Replace non-IPv6 equipment (complete)	• FY08